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ACIDIC PRECIPITATION IN ONTARIO STUDY

PRECIPITATION CONCENTRATION AND WET DEPOSITION FIELDS OF POLLUTANTS IN ONTARIO, 1982

DECEMBER, 1984

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Ministry of the Environment

The Honourable
Morley Kells
Minister

Dr. Allan E. Dyer
Deputy Minister

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The authors would also thank Dr. M. A. Lusis and members of the APIOS Atmospheric Processes Work Group for their critical comments of this report.

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1. INTRODUCTION

This report is the second of a series of reports showing the annual patterns in Ontario of precipitation concentration and wet deposition of selected pollutants. The first report of the 1980/81 results was published in 1983 (Chan, Tang and Lusis, 1983). Pollutants deposit on the earth's surfaces through both wet and dry mechanisms. The partition into the two forms depends on characteristics of emissions, meteorology and surfaces. It also varies from pollutant to pollutant. The determination of wet deposition is straightforward compared to that of dry deposition. This report summarizes the wet deposition results only and the component of dry deposition will be addressed in a separate report which will discuss also the relative importance of dry and wet deposition with respect to total deposition of selected pollutants (Chan et al., 1985).

In this report, emphasis has been put on the physical phenomenon of wet deposition. No attempts were made to address the significance of these results to effects and control strategies.

Results reported here were obtained from the Acidic Precipitation in Ontario (APIOS) cumulative network which has been established to determine long term wet deposition pattern in Ontario. At the inception of the network, a monthly sampling period was used. As of January 5, 1982, the network began sampling on a 28-day basis in order to maximize the capability of data intercomparison with other North American networks such as the National Atmospheric Deposition Program (NADP) and the Quebec network, which sample on a weekly basis.

Descriptions of the APIOS cumulative network with regard to network siting, instrumentation and analytical methods are given in another document (Chan et al., 1982). Since 1982, some modifications have taken place and they are summarized in another report (Chan et al., 1984).

2. DATA PREPARATION AND PRESENTATION

As the duration of the sampling period was 28d, there were 13 sampling periods in 1982 beginning on January 5, 1982 and ending on January 4, 1983.

Sangamo samplers were used to collect wet-only samples for chemical analysis. Each site was also equipped with a storage gauge to determine the actual precipitation depth from which wet deposition was calculated. Whenever storage gauge readings are missing, they are replaced by appropriate values interpolated from data obtained in the Environment Canada's CLIMAT Network (CLIMAT) 1982.

Annual average concentrations reported here are precipitation depth weighted concentrations calculated according to:

$$C_{av} = \sum_{i=1}^{n} Ci \cdot Di / \sum_{i=1}^{n} Di$$

where C_{av} = precipitation depth weighted concentration

Ci = concentration of individual cumulative sample measured during collection period i

Di = precipitation depth determined from storage gauge or CLIMAT network (see above) measured during collection period i.

N = number of available precipitation and concentration measurements during the study period

Annual depositions reported here are calculated according to:

$$Dep = C_{av} \times \sum_{i=1}^{n} D_i$$

where Dep = deposition

The concentration and precipitation gauge data have been reported elsewhere (Ontario Ministry of the Environment, 1984).

Tables 1 and 2 summarize the annual average concentration and wet deposition from which isopleths are drawn. The monitoring stations may be divided into three groups based on their geographical locations, i.e. Southern Ontario Stations (#1 to #14), Central Ontario Stations (#15 to #23) and Northern Ontario Stations (#24 to #36). Annual results calculated from less than eight out of the thirteen sampling periods are underlined. In synthesizing the annual concentration and deposition values, only stations with concentration data from at least eight out of the thirteen sampling periods are retained in the contours. A modified Kriging scheme (Tang, 1984) was used in the contour calculations.

3. RESULTS AND DISCUSSION

Results given in Tables 1 and 2 are presented as contours of annual average precipitation concentration and wet deposition in this section. No contours for Ni and V are shown because most of the observed concentrations were at the detection limits. In all the contour figures, the station numbers are given on the bottom left hand corner for each of the monitoring stations whereas the results are indicated on the top right hand corner. In view of the close relationship between precipitation amount and wet deposition, the contours should be examined in light of the annual precipitation pattern in Ontario. The 1982 results may also reflect the impact due to the shutdown of the Sudbury smelters in the latter half of 1982. A separate report assessing the impact of the smelter shutdown on precipitation quality and wet deposition in Ontario has been prepared (Tang et al., 1984). As far as year-to-year variability is concerned, this will be the subject of a future report, once a larger database has been accumulated to permit meaningful statistical analysis to be carried out. We therefore refrain here from a detailed quantitative comparison with the 1980/81 results.

3.1 Annual Precipitation Field

Figure 2 shows the contours of the 1982 annual precipitation depth in Ontario based on the Environment Canada CLIMAT network data. Except in the NW part of the province, most parts of Ontario received 80-110 cm of precipitation in 1982. Relatively higher precipitation occurs in the southwestern, central and northeastern parts of Ontario. The higher values observed east of Georgian Bay are probably a result of lake effects. The precipitation contours in these areas are quite complex; however, in the NW part of Ontario, a negative gradient occurs along the SE to NW axis.

3.2 Annual Concentration and Deposition Fields

3.2.1 H_f^+ (free hydrogen*):

The free hydrogen ion concentration (calculated from the laboratory pH measurements) field is given in Figure 3a. There seems to be a general decrease along the SE to NW axis with somewhat more complex contours in southern and central Ontario. There is a-10-fold difference in H_f^+ concentration across the province. High H_f^+ concentrations are observed at stations in the SW (#1: 82.4 ug l^{-1} and #3: 92.8 ug l^{-1}), in the SE (#14: 92.30 ug l^{-1}), and in the NE (#23: 85.40 ug l^{-1}). Most sites in general have higher concentrations in 1982 than in 1981. For convenience of visual inspection, the corresponding pH values are indicated along the H_f^+ isolines.

The corresponding deposition contours (Figure 3b) have similar features to those in Figure 3a. There are local high values which occur in central and southern Ontario, e.g. #3: 89.4 mg m^{-2} yr^{-1} and #18: 77.4 mg m^{-2} yr^{-1}. Values in SW are in general less than those in 1981 whereas at most other sites, the 1981 and 1982 results are comparable.

3.2.2 H_t^+ (total hydrogen*):

The profiles of the H_t^+ (total hydrogen) concentration (Figure 4a) and deposition (Figure 4b) are similar to those of the H_f^+ except the values are higher. Local high concentration values occur at stations #1, 3, 14, and 23 and high deposition values at #3 and 18. Compared to 1981, the H_t^+ deposition values decreased by about 20-30%.

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* pH is a measure of the free acidic component of precipitation due primarily to strong mineral acids such as sulfuric acid and nitric acid. It is equal to the negative logarithm of the free hydrogen ion concentration (expressed in moles per litre). Total acidity, which is related to the total hydrogen ions, is a measure of the capacity of the precipitation sample to neutralize bases and is made up of contributions due to strong acids, weak acids (e.g. carbonic and organic acids) and hydrolyzable metallic salts, etc.

Examining Figures 3 and 4 together, it is noted that typically, free hydrogen ions account for about 40 to 80% of the total hydrogen ions from northern Ontario to southern Ontario.

3.2.3 $SO_4^=$ (sulfate):

Figures 5a and 5b represent the concentration and deposition contours respectively. Both show a negative gradient along the S to N axis in southern and central Ontario; whereas the gradient is more towards SE to NW in northern Ontario.

A high sulfate concentration is observed at station #23, where high H_f^+ and H_t^+ concentrations are also observed. In general the contours are less complex in 1982 than in 1981, and the concentration values are higher in 1982 than in 1981 for most of the stations.

There is a general decrease in $SO_4^=$ deposition in central and southern Ontario in 1982 with respect to that in 1981. The 20 kg ha^{-1} yr^{-1} (2 g m^{-2} yr^{-1}) isoline occurs around stations #22 and 24, i.e. all areas south of Lake Superior are receiving wet sulfate deposition at a level that is potentially harmful to sensitive water bodies (MOI, 1983).

3.2.4 $N\text{-}NO_3^-$ (nitrogen-nitrate):

Figure 6a shows the annual average $N\text{-}NO_3^-$ concentration contours. There is a negative S to N gradient, with higher values in southern Ontario. A very high value is observed at station #10 (.75 mg l^{-1}) and anomalously high and low values are observed at stations #23 (.58 mg l^{-1}) and #19 (.37 mg l^{-1}). The 1982 contours are less complex than those of 1981 and the station values may be higher or lower than those of 1981. Local high deposition values occur at stations #10 (.71 g m^{-2} yr^{-1}), #3 (.61 g m^{-2} yr^{-1}) and #7 (.61 g m^{-2} yr^{-1}).

Comparing Figures 5 and 6, the ratios of $SO_4^{=}/N\text{-}NO_3^{-}$ can be obtained which can be used as an indicator of the relative importance of H_2SO_4 and HNO_3 to acid deposition. It is noted that the sulfate-to-nitrate ratio is somewhat higher in southwestern Ontario but lower in central and northwestern Ontario with an average value of 1.97 ± 0.27 when expressed in terms of equivalence. Thus the dominant contribution to precipitation acidity comes from sulfates.

3.2.5 $N\text{-}NH_4^{+}$ (nitrogen-ammonium):

Figures 7a and 7b represent the 1982 annual average concentration and wet deposition of ammonium ions in Ontario. There is a general negative SW to NE gradient with the highest concentrations in southwestern Ontario. Concentration values differ by a factor of three across the province. In general they are lower than those of 1981. In the case of deposition, except for a few sites in the SW and NW which have higher deposition than 1981, most sites have lower deposition values. Local high values occur at stations #7 (.61 g m^{-2} yr^{-1}) and #10 (.62 g m^{-2} yr^{-1}).

3.2.6 N-TKN (nitrogen-total kjeldahl nitrogen) and $P\text{-}PO_4^{3-}$ (phosphorous-phosphate):

Both parameters have similar contour profiles (Figures 8a, b, and 9a, b respectively) with a negative S to N gradient. Values in central Ontario are lower and values in both SW and NW are higher.

In the case of N-TKN, there is a three-fold difference in concentration across the province. With respect to 1981, the 1982 SW results are higher but those in central Ontario are lower. There are high local deposition values at stations #6 (.72 g m^{-2} yr^{-1}), #1 (.72 gm^{-2} yr^{-1}) and #7 (.76 g m^{-2} yr^{-1}), and a minimum at #26 (.19 g m^{-2} yr^{-1}).

In the case of $P\text{-}PO_4^{3-}$, the 1982 values are in general lower compared to those of 1981 except in the SW region.

3.2.7 Cu (copper):

In generating the isopleth maps in Figures 10a and 10b, some previously reported values (Ontario Ministry of the Environment, 1984) have been excluded. These anomalous results may be real but because they all occurred during the month of January, it is suspected that they were associated with some rather unusual phenomenon for that particular month and therefore are not representative of the sites of an average sampling period. Therefore they were not included in the con-tour calculations.

The concentration contour displays little large-scale spatial variability with many local high values (stations #36: 2.23 ug l^{-1}, #27: 2.16 ug l^{-1}, #16: 2.08 ug l^{-1}, #14: 2.17 ug l^{-1}, and low values (#15: 0.94 ug l^{-1} #6: 0.91 ug l^{-1}, and #20: 0.77 ug l^{-1}). The 1982 values are typically a factor of two lower than those of the 1981 and may reflect the effect of the Sudbury smelters shutdown in the second half of 1982.

The deposition contour profile is similar to that of the concentration. Values are also lower with respect to the 1981 values. High local deposition values are observed at stations #8 (1.79 mg m^{-2} yr^{-1}), #11 (1.69 mg m^{-2} yr^{-1}), #22 (1.68 mg m^{-2} yr^{-1}) and #27 (1.66 mg m^{-2} yr^{-1}) and low values at #26 (0.69 mg m^{-2} yr^{-1}) and #15 (0.62 mg m^{-2} yr^{-1}).

3.2.8 Fe (iron), Al (aluminum), Ca^{++} (calcium), Mg^{++} (magnesium), and K^{+} (potassium):

These parameters are grouped together because of their common soil-related origin. Contours for Fe are shown in Figures 11a and 11b. No simple pattern can be recognized. Higher values are observed in SW and NW Ontario whereas lower values are in central Ontario. The 1982 values are somewhat lower than the 1981 ones.

The Al profile (Figures 12a and 12b) are similar to those of Fe and are lower than the 1981 ones.

Ca^{++} (Figures 13a and 13b) displays a negative S to N gradient in general with the exception that values in the NW are higher than those in central Ontario. A very high concentration is observed at station #1 (.74 mg l^{-1}) and a low one at station #25 (.11 mg l^{-1}). The 1982 concentration values in general decrease over the 1981 ones but the deposition values, except for SW Ontario, decrease only slightly.

Mg^{++} (Figures 14a and 14b) has a SW-NE gradient with a maximum at station #1 (concentration: .21 mg l^{-1} and deposition 0.17 g m^{-2} yr^{-1}). The 1982 concentration data are lower than the 1981 ones but the 1982 deposition data are higher in the SW but lower in elsewhere with respect to the 1981 values.

K^{+} (Figures 15a and 15b) has irregular patterns with high values in SW and NW Ontario. They are in general lower than the 1981 values.

3.2.9 Pb (lead), Zn (zinc), Mn (manganese), and Cd (cadmium):

Concentration and deposition contours for Pb are shown in Figure 16a and 16b. There is a SE to NW gradient. Values in general are higher in SE and SW Ontario, and are lower than or comparable to those of 1981. Higher concentration and deposition values are observed at site #8 (12.22 ug l^{-1} and 11.41 mg m^{-2} yr^{-1}).

Profiles of Zn concentration and deposition (Figures 17a and 17b) are similar. Values are lower in central Ontario but higher in SW, NW and N. The highest concentration and deposition are found at station #10 (12.11 ug l^{-1} and 11.50 mg m^{-2} yr^{-1}). Other local high and low concentration values are found at #1 (11.36 ug l^{-1}) #5 (11.38 ug l^{-1}), and #32 (3.09 ug l^{-1}) and #20 (3.48 ug l^{-1}) respectively. The 1982 values are in general lower than those in 1981 - up to a factor of two -and may be related to the shutdown of the Sudbury smelters in the latter half of 1982.

Mn concentration and deposition and contours are shown in Figures 18a and 18b, and they are found to be similar. The values are higher in the south and also in the NW. Higher values are found at stations #10 (9.56 ug l^{-1}) and #1 (6.42 ug l^{-1}) and low values at #20 (1.63 ug l^{-1}), #19 (1.66 ug l^{-1}) and #27 (1.68 ug l^{-1}). The 1982 values are lower than those of 1981.

Cd contours are shown in Figures 19a and 19b. These values are only approximate as many of the original concentration results are at the analytical detection limit. The values are higher in SW and NW. It is interesting to note that the Cd contours are similar to those of Cu.

3.2.10 Na^+ (sodium) and Cl^- (chloride):

Concentration and deposition contours of these two parameters are given in Figures 20a and 20b, and 21a and 21b respectively. Because these two ions are chemically associated, their profiles are similar. There is a negative S to N gradient with maximum values in the SW. There are local high Na^+ values at stations such as #2 (0.21 mg l^{-1} and .17 g m^{-2} yr^{-1}) and #1 (0.17 mg l^{-1} and 0.14 g m^{-2} yr^{-1}) and low values #32 (25.8 ug l^{-1} and 23.2 mg m^{-2} yr^{-1}). High Cl^- values are found at #10 (0.46 mg l^{-1}) and #1 (0.40 mg l^{-1}), and low values at #27 and #31 (63 ug l^{-1}) and #32 (56 ug l^{-1}). The 1982 Na^+ and Cl^- results in the SW and NW are somewhat higher than those of 1981, and the 1982 results at other locations are comparable to or lower than the 1981 ones.

3.3 Seasonal Variation

Results have been rearranged to obtain seasonal concentration and deposition values. These are grouped under headings of Winter 81/82 (November 30/81 to March 2/82), Spring 82 (March 2/82 to May 25/82), Summer 82 (May 26/82 to September 14/82) and Autumn 82 (September 15/82 to December 7/82). Tables 3 to 6 and 7 to 10 summarize the corresponding seasonal average concentration and

wet deposition. In these tables, stations with no data during the season of interest are labelled with a dot (.) whereas those with only one value (winter 81/82, spring 82, and autumn 82) and one or two values only (summer 82) are underlined.

As expected from the distribution of emission sources, annual sulfate and nitrate concentrations in southern Ontario are higher, by a factor of three or more, than those in northern Ontario. The results show that in southern Ontario, precipitation sulfate concentrations are higher in the spring and summer months than in winter and fall, whereas nitrates seem to be much more comparable throughout the year. Similar observations have been made by others (e.g. Barrie et al., 1982; MAP3S/RAINE, 1982; Pack and Pack, 1979; Pratt and Krupa, 1983). However, in northern Ontario, a different seasonal trend is suggested, with elevated nitrate concentrations during the winter and spring, and a smaller seasonal variation in the sulfates. Similar seasonal trends can be detected in the 1981 data for Ontario (Chan et al., 1983), and suggest that observations on seasonal variability of precipitation sulfates and nitrates, made within high emission density areas, may not apply to more remote receptor areas.

The variability of sulfate and nitrate deposition reflects variations in both concentration and precipitation amount (which is lower in the winter than in the summer, and in the north as compared to the south of the province, by a factor of roughly two). Thus, wintertime sulfate wet deposition also tends to be lower across the province than that during the summer, by a factor of two or so. On the other hand, nitrate wet deposition is elevated during the summer (compared to other seasons) in southern Ontario, but is roughly comparable throughout the year in the northern parts of the province.

For other parameters, readers are referred to the tables for specific information regarding their seasonal patterns which may vary with parameters and monitoring stations.

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TABLE 1 :
GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L) - 1982

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4
COLCHESTER	1	0.0824	0.0995	5.57	0.640	0.741	0.399	0.927	0.2120	0.0752	0.1747	0.673
MERLIN	2	0.0666	0.0885	4.59	0.605	0.622	0.371	0.806	0.1924	0.0532	0.2100	0.508
PORT STANLEY	3	0.0928	0.1134	4.55	0.633	0.428	0.254	0.604	0.1243	0.0486	0.1071	0.435
WILKESPORT	4	0.0637	0.0901	4.74	0.590	0.656	0.317	0.775	0.0902	0.0772	0.1360	0.658
ALVINSTON	5	0.0524	0.0755	3.80	0.537	0.580	0.247	0.586	0.1090	0.1176	0.1086	0.438
HURON PARK	6	0.0598	0.0851	4.67	0.654	0.736	0.240	0.819	0.1375	0.0569	0.0997	0.660
WATERLOO	7	0.0629	0.0774	4.07	0.601	0.437	0.218	0.757	0.0999	0.1000	0.0777	0.604
PALMERSTON	8	0.0603	0.0760	3.67	0.550	0.348	0.218	0.736	0.0955	0.0520	0.0743	0.615
SHALLOW LAKE	9	0.0641	0.0841	3.11	0.534	0.278	0.181	0.613	0.0658	0.0535	0.0820	0.473
MILTON	10	0.0410	0.0633	5.12	0.749	0.620	0.464	0.888	0.1571	0.1341	0.1185	0.652
UXBRIDGE	11	0.0549	0.0749	3.77	0.544	0.428	0.282	0.553	0.0764	0.0344	0.1290	0.412
COLDWATER	12	0.0538	0.0786	2.60	0.453	0.271	0.150	0.471	0.0406	0.0531	0.0547	0.360
CAMPBELLFORD	13	0.0676	0.0811	3.62	0.533	0.469	0.156	0.550	0.0528	0.0460	0.0620	0.412
KALADAR	14	0.0923	0.1119	3.94	0.561	0.242	0.155	0.526	0.0336	0.0362	0.0697	0.388
SMITH'S FALLS	15	0.0609	0.0811	3.63	0.539	0.495	0.177	0.478	0.1359	0.0470	0.0880	0.370
DALHOUSIE MILLS	16	0.0715	0.0898	3.63	0.544	0.442	0.185	0.594	0.0471	0.0582	0.0874	0.450
GOLDEN LAKE	17	0.0640	0.0825	2.76	0.432	0.188	0.111	0.471	0.0350	0.0342	0.0336	0.339
WILBERFORCE	18	0.0698	0.0952	2.99	0.508	0.185	0.136	0.393	0.0271	0.0339	0.0433	0.320
WHITNEY	19	0.0549	0.0775	2.40	0.370	0.159	0.100	0.358	0.0225	0.0305	0.0275	0.260
DORSET	20	0.0669	0.0865	2.81	0.464	0.180	0.132	0.374	0.0256	0.0168	0.0413	0.314
MCKELLAR	21	0.0710	0.0945	2.79	0.520	0.193	0.198	0.486	0.0298	0.0618	0.0731	0.357
MATTAWA	22	0.0615	0.0807	2.44	0.430	0.183	0.187	0.350	0.0311	0.0406	0.0948	0.290
KILLARNEY	23	0.0854	0.1126	3.80	0.581	0.231	0.156	0.415	0.0383	0.0464	0.0498	0.477
BEAR ISLAND	24	0.0589	0.0752	2.51	0.360	0.175	0.102	0.379	0.0410	0.0441	0.0484	0.236
GOWGANDA	25	0.0639	0.0842	2.33	0.286	0.108	0.094	0.394	0.0289	0.0559	0.0446	0.203
RAMSEY	26	0.0495	0.0690	2.16	0.302	0.134	0.081	0.327	0.0264	0.0378	0.0420	0.225
MOONBEAM	27	0.0339	0.0516	1.88	0.208	0.173	0.063	0.301	0.0319	0.0332	0.0408	0.218
ATTAWAPISKAT	28	0.0034	0.0295	0.69	0.206	0.150	0.335	1.216	0.1040	0.2776	0.2010	0.393
WINISK	29	0.0042	0.0260	0.96	0.103	0.332	0.753	0.165	0.0965	0.0567	0.4940	0.120
NAKINA	30	0.0125	0.0325	1.42	0.194	0.232	0.079	0.505	0.0487	0.0508	0.0494	0.251
DORION	31	0.0304	0.0498	1.79	0.262	0.195	0.063	0.489	0.0310	0.0370	0.0422	0.305
QUETICO CENTRE	32	0.0149	0.0374	1.21	0.214	0.169	0.056	0.450	0.0288	0.0361	0.0258	0.305
LAC LA CROIX	33	0.0158	0.0361	1.32	0.245	0.225	0.079	0.533	0.0368	0.0579	0.0461	0.327
E.L.A.	34	0.0145	0.0378	1.57	0.266	0.274	0.068	0.517	0.0420	0.0547	0.0420	0.385
EAR FALLS	35	0.0078	0.0350	1.21	0.204	0.206	0.092	0.527	0.0343	0.1010	0.0606	0.298
PICKLE LAKE	36	0.0133	0.0371	1.16	0.187	0.187	0.091	0.559	0.0303	0.0593	0.0375	0.323

——— **Less then 2 values**

TABLE 1 (CONTINUED)
GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L) - 1982

	ID	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	0.0377	0.00642	0.000511	0.01136	0.0713	0.00940	0.00100	0.0614	0.00190	0.000182
MERLIN	2	0.0240	0.00444	0.000585	0.00759	0.0534	0.00755	0.00100	0.0593	0.00149	0.000090
PORT STANLEY	3	0.0424	0.00615	0.000500	0.00657	0.0425	0.00572	0.00156	0.0402	0.00132	0.000200
WILKESPORT	4	0.0316	0.00478	0.000614	0.00971	0.0577	0.00653	0.00122	0.0552	0.00183	0.000173
ALVINSTON	5	0.0234	0.00508	0.000500	0.01178	0.0703	0.00457	0.00100	0.0612	0.00174	0.000089
HURON PARK	6	0.0184	0.00409	0.000561	0.00967	0.0553	0.00797	0.00100	0.0395	0.00091	0.000066
WATERLOO	7	0.0438	0.00548	0.000574	0.00742	0.0484	0.00655	0.00100	0.0367	0.00137	0.000136
PALMERSTON	8	0.0142	0.00541	0.000733	0.00787	0.0393	0.01222	0.00116	0.0334	0.00191	0.000144
SHALLOW LAKE	9	0.0186	0.00300	0.000500	0.00723	0.0442	0.00434	0.00100	0.0379	0.00121	0.000079
MILTON	10	0.0406	0.00956	0.000582	0.01211	0.0800	0.00929	0.00100	0.0488	0.00164	0.000114
UXBRIDGE	11	0.0133	0.00222	0.000500	0.00736	0.0291	0.00526	0.00100	0.0194	0.00177	0.000158
COLDWATER	12	0.0157	0.00290	0.000548	0.00497	0.0345	0.00549	0.00108	0.0308	0.00117	0.000065
CAMPBELLFORD	13	0.0148	0.00323	0.000500	0.00743	0.0448	0.00553	0.00100	0.0341	0.00191	0.000082
KALADAR	14	0.0140	0.00322	0.000586	0.00589	0.0491	0.00815	0.00100	0.0408	0.00217	0.000071
SMITH'S FALLS	15	0.0092	0.00324	0.000559	0.00508	0.0311	0.00740	0.00100	0.0203	0.00094	0.000088
DALHOUSIE MILLS	16	0.0140	0.00409	0.000737	0.00809	0.0460	0.00931	0.00110	0.0323	0.00208	0.000129
GOLDEN LAKE	17	0.0127	0.00226	0.000615	0.00627	0.0306	0.00626	0.00100	0.0187	0.00166	0.000087
WILBERFORCE	18	0.0077	0.00209	0.000621	0.00702	0.0271	0.00678	0.00107	0.0214	0.00113	0.000142
WHITNEY	19	0.0100	0.00166	0.000535	0.00427	0.0204	0.00486	0.00125	0.0174	0.00148	0.000180
DORSET	20	0.0063	0.00163	0.000500	0.00348	0.0230	0.00553	0.00100	0.0157	0.00077	0.000071
MCKELLAR	21	0.0062	0.00275	0.000566	0.00555	0.0366	0.00645	0.00103	0.0265	0.00131	0.000083
MATTAWA	22	0.0084	0.00308	0.000735	0.00434	0.0494	0.00513	0.00102	0.0380	0.00189	0.000086
KILLARNEY	23	0.0073	0.00266	0.000560	0.00693	0.0375	0.00803	0.00104	0.0359	0.00128	0.000081
BEAR ISLAND	24	0.0093	0.00331	0.000706	0.00586	0.0466	0.00484	0.00105	0.0380	0.00108	0.000150
GOWGANDA	25	0.0086	0.00156	0.000689	0.00536	0.0206	0.00402	0.00107	0.0151	0.00137	0.000127
RAMSEY	26	0.0092	0.00236	0.000591	0.00473	0.0292	0.00218	0.00105	0.0306	0.00118	0.000080
MOONBEAM	27	0.0054	0.00168	0.000519	0.00728	0.0245	0.00380	0.00104	0.0196	0.00216	0.000194
ATTAWAPISKAT	28	0.0865	0.00405	0.000500	0.01158	0.0723	0.00163	0.00100	0.0281	0.00232	0.000233
WINISK	29	0.0057	0.00121	0.000500	0.00668	0.0312	0.00136	0.00100	0.0158	0.00129	0.000115
NAKINA	30	0.0148	0.00277	0.000539	0.00602	0.0562	0.00320	0.00108	0.0296	0.00120	0.000096
DORION	31	0.0129	0.00254	0.000628	0.00371	0.0275	0.00291	0.00118	0.0261	0.00145	0.000086
QUETICO CENTRE	32	0.0103	0.00286	0.000571	0.00309	0.0252	0.00328	0.00108	0.0216	0.00122	0.000073
LAC LA CROIX	33	0.0170	0.00454	0.000630	0.00659	0.0616	0.00268	0.00109	0.0405	0.00175	0.000126
E.L.A.	34	0.0127	0.00520	0.000646	0.00489	0.0553	0.00259	0.00106	0.0516	0.00147	0.000107
EAR FALLS	35	0.0265	0.00644	0.000994	0.00666	0.0408	0.00323	0.00100	0.0404	0.00243	0.000091
PICKLE LAKE	36	0.0181	0.00287	0.000726	0.00765	0.0439	0.00323	0.00121	0.0390	0.00223	0.000182

——— Less then 2 values

TABLE 2 :
ANNUAL DEPOSITION (MG/M**2) - 1982

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	64.4	77.7	4352	500.2	579.3	311.7	724.6	165.6	58.7	136	526.0	29.4	5.01	0.4	8.88	55.7	7.34	0.781	48.0	1.49	0.143
MERLIN	2	52.9	70.3	3649	480.6	494.0	294.5	640.4	152.8	42.2	167	403.4	19.1	3.53	0.5	6.03	42.4	6.00	0.794	47.1	1.18	0.071
PORT STANLEY	3	89.5	109.4	4387	610.4	413.3	244.7	582.6	119.9	46.9	103	419.4	40.9	5.94	0.5	6.34	41.0	5.51	1.501	38.8	1.28	0.193
WILKESPORT	4	44.5	62.9	3313	412.7	458.4	221.5	541.5	63.1	54.0	95.1	459.9	22.1	3.34	0.4	6.79	40.3	4.56	0.851	38.6	1.28	0.121
ALVINSTON	5	44.5	64.1	3228	456.2	492.2	210.0	497.7	92.5	99.8	92.2	371.7	19.9	4.32	0.4	9.66	59.7	3.88	0.849	52.0	1.48	0.076
HURON PARK	6	52.9	75.2	4127	578.5	650.5	212.3	724.5	121.6	50.3	88.2	583.5	16.3	3.62	0.5	8.56	48.9	7.04	0.884	34.9	0.80	0.058
WATERLOO	7	63.4	78.1	4111	606.6	441.3	220.3	764.1	100.8	101	78.4	609.3	44.2	5.53	0.6	7.48	48.8	6.61	1.009	37.0	1.38	0.137
PALMERSTON	8	56.3	70.9	3428	513.7	325.3	203.3	687.1	89.2	48.6	69.4	574.1	13.3	5.05	0.7	7.35	36.7	11.41	1.079	31.2	1.79	0.135
SHALLOW LAKE	9	63.0	82.7	3061	524.8	273.6	178.0	603.0	64.7	52.6	80.6	464.9	18.3	2.95	0.5	7.11	43.5	4.27	0.983	37.2	1.19	0.078
MILTON	10	39.0	60.1	4861	711.6	588.8	440.3	843.2	149.2	127	113	619.4	38.6	9.07	0.6	11.50	76.0	8.82	0.950	46.4	1.56	0.108
UXBRIDGE	11	52.3	71.4	3593	518.6	408.0	268.6	527.8	72.9	32.8	123	392.6	12.7	2.11	0.5	7.02	27.8	5.02	0.954	18.5	1.69	0.151
COLDWATER	12	49.6	72.5	2404	418.1	250.5	138.7	434.8	37.4	49.0	50.5	332.1	14.5	2.67	0.5	4.59	31.8	5.07	0.992	28.4	1.08	0.060
CAMPBELLFORD	13	58.6	70.4	3141	462.0	406.6	135.7	477.4	45.8	39.9	53.8	357.7	12.8	2.80	0.4	6.44	38.9	4.80	0.868	29.6	1.65	0.071
KALADAR	14	61.6	74.7	2633	374.7	161.9	103.5	351.3	22.4	24.2	46.5	258.7	9.3	2.15	0.4	3.93	32.8	5.44	0.668	27.3	1.45	0.047
SMITH'S FALLS	15	39.7	52.9	2366	351.1	322.8	115.4	311.6	88.6	30.6	57.4	241.3	6.0	2.11	0.4	3.31	20.3	4.83	0.652	13.3	0.62	0.058
DALHOUSIE MILLS	16	59.3	74.4	3006	450.9	366.5	153.2	491.8	39.0	48.2	72.4	372.8	11.6	3.39	0.6	6.71	38.1	7.71	0.912	26.7	1.72	0.107
GOLDEN LAKE	17	41.6	53.6	1789	280.6	121.9	72.2	306.0	22.7	22.2	21.8	220.4	8.3	1.47	0.4	4.07	19.9	4.06	0.649	12.1	1.08	0.057
WILBERFORCE	18	77.4	105.6	3317	564.0	204.8	150.9	436.2	30.1	37.6	48.1	355.1	8.5	2.32	0.7	7.80	30.1	7.52	1.185	23.7	1.26	0.158
WHITNEY	19	48.4	68.2	2110	325.5	140.0	88.4	315.7	19.8	26.9	24.3	229.4	8.8	1.46	0.5	3.76	18.0	4.28	1.100	15.4	1.30	0.158
DORSET	20	69.0	89.3	2896	478.3	186.2	136.3	385.9	26.4	17.4	42.6	324.3	6.5	1.68	0.5	3.59	23.7	5.71	1.032	16.2	0.79	0.073
MCKELLAR	21	66.3	88.3	2604	486.0	180.4	185.3	453.7	27.9	57.7	68.2	333.2	5.8	2.57	0.5	5.18	34.2	6.03	0.960	24.7	1.22	0.078
MATTAWA	22	54.6	71.7	2169	381.7	162.3	166.5	310.9	27.6	36.0	84.2	257.3	7.4	2.74	0.7	3.85	43.9	4.55	0.909	33.8	1.68	0.077
KILLARNEY	23	64.6	85.1	2870	438.9	174.9	117.6	313.6	28.9	35.1	37.7	360.8	5.6	2.01	0.4	5.24	28.3	6.07	0.789	27.1	0.97	0.061
BEAR ISLAND	24	38.2	48.8	1632	233.8	113.8	66.3	245.8	26.6	28.6	31.4	153.4	6.1	2.15	0.5	3.81	30.3	3.14	0.680	24.7	0.70	0.097
GOWGANDA	25	33.9	44.6	1235	151.7	57.3	49.9	208.8	15.3	29.6	23.6	107.5	4.5	0.82	0.4	2.84	10.9	2.13	0.567	8.0	0.73	0.067
RAMSEY	26	29.0	40.4	1265	177.1	78.4	47.7	191.5	15.4	22.1	24.6	131.7	5.4	1.38	0.3	2.77	17.1	1.28	0.617	17.9	0.69	0.047
MOONBEAM	27	26.0	39.5	1437	159.2	132.4	48.5	230.3	24.4	25.5	31.2	167.2	4.2	1.28	0.4	5.57	18.7	2.91	0.794	15.0	1.66	0.148
ATTAWAPISKAT	28	2.7	23.3	549	163.2	118.8	265.2	961.9	82.3	220	159	311.2	68.5	3.21	0.4	9.16	57.2	1.29	0.791	22.2	1.84	0.184
WINISK	29	1.7	10.3	381	40.5	131.3	297.7	65.4	38.1	22.4	195	47.3	2.3	0.48	0.2	2.64	12.3	0.54	0.395	6.2	0.51	0.045
NAKINA	30	7.9	20.6	901	123.3	147.2	50.1	320.4	30.9	32.2	31.3	159.3	9.4	1.76	0.3	3.82	35.7	2.03	0.684	18.8	0.76	0.061
DORION	31	24.7	40.5	1453	212.6	158.1	51.0	397.0	25.2	30.1	34.3	247.9	10.5	2.06	0.5	3.02	22.3	2.36	0.959	21.2	1.18	0.070
QUETICO CENTRE	32	13.4	33.6	1084	192.4	151.5	50.5	404.3	25.9	32.4	23.2	274.1	9.3	2.57	0.5	2.78	22.6	2.95	0.969	19.4	1.10	0.066
LAC LA CROIX	33	12.2	27.9	1017	188.7	173.1	61.2	410.6	28.4	44.6	35.5	251.8	13.1	3.50	0.5	5.08	47.5	2.07	0.840	31.2	1.35	0.097
E.L.A.	34	9.2	24.0	996	169.1	174.0	43.1	328.0	26.7	34.7	26.7	244.7	8.0	3.30	0.4	3.10	35.1	1.64	0.672	32.8	0.94	0.068
EAR FALLS	35	4.9	21.7	749	126.7	127.8	57.0	327.3	21.3	62.8	37.6	185.3	16.5	4.00	0.6	4.14	25.3	2.01	0.621	25.1	1.51	0.057
PICKLE LAKE	36	7.9	22.0	686	110.7	110.4	53.9	330.7	17.9	35.1	22.2	191.3	10.7	1.70	0.4	4.52	26.0	1.91	0.715	23.1	1.32	0.107

——— Less then 2 values

TABLE 3 :
SEASONAL GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L)

SEASON = WINTER 81/82

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4
COLCHESTER	1	0.0472	0.0924	3.05	0.632	0.817	0.770	0.423	0.2168	0.1286	0.4468	0.214
MERLIN	2	0.1318	0.0769	3.63	0.670	0.620	0.743	0.450	0.4646	0.0907	0.4661	0.215
PORT STANLEY	3	0.1660	0.0441	4.33	0.697	.	0.689	0.850	0.4900	0.1649	0.3710	0.155
WILKESPORT	4	0.0237	0.0518	3.06	0.650	1.070	0.569	0.486	0.1237	0.1149	0.3059	0.271
ALVINSTON	5	0.0006	0.0416	3.91	0.940	1.840	0.619	0.383	0.3500	0.1670	0.3100	0.109
HURON PARK	6	0.0955	0.1480	4.95	1.410	1.020	0.520	0.880	0.1600	0.1450	0.4000	0.730
WATERLOO	7	0.0871	0.0480	2.99	0.689	0.860	0.307	0.750	0.3001	0.0627	0.1364	0.525
PALMERSTON	8	0.0437	0.0454	4.42	0.716	1.020	0.683	.	0.3400	0.0944	0.2600	0.650
SHALLOW LAKE	9	0.0572	0.0800	2.30	0.655	0.291	0.283	0.314	0.0823	0.0401	0.1428	0.385
MILTON	10	.	0.0335	3.61	0.951	.	2.530	0.568	.	0.0689	0.5500	0.358
UXBRIDGE	11	0.0420	0.0818	2.43	0.509	0.705	0.670	0.556	0.0430	0.0139	0.2611	0.294
COLDWATER	12	0.0337	0.0648	0.81	0.350	0.159	0.222	0.246	0.0191	0.0121	0.0880	0.119
CAMPBELLFORD	13	0.0321	0.0485	1.67	0.494	0.526	0.252	0.286	0.0462	0.0651	0.1403	0.209
KALADAR	14	0.0287	0.1458	0.74	0.268	0.101	0.243	0.630	0.0142	0.0255	0.0684	0.175
SMITH'S FALLS	15	0.0284	0.0456	1.65	0.510	0.767	0.448	0.350	0.2100	0.1090	0.3093	0.173
DALHOUSIE MILLS	16	0.0366	0.0772	1.39	0.531	0.330	0.254	0.264	0.0302	0.0794	0.1302	0.258
GOLDEN LAKE	17	0.0415	0.0799	1.12	0.412	0.141	0.142	0.207	0.0312	0.0307	0.0876	0.119
WILBERFORCE	18	0.0533	0.0904	1.40	0.474	0.129	0.162	0.260	0.0116	0.0209	0.0600	0.186
WHITNEY	19	0.0293	0.0585	0.57	0.314	0.051	0.109	0.254	0.0025	0.0071	0.0209	0.126
DORSET	20	0.0598	0.0942	1.41	0.560	0.128	0.196	0.271	0.0146	0.0113	0.0564	0.176
MCKELLAR	21	0.0402	0.0749	1.25	0.458	0.107	0.333	0.378	0.0138	0.0559	0.2365	0.258
MATTAWA	22	0.0500	0.0862	1.21	0.608	0.249	0.526	0.180	0.0267	0.0546	0.3946	0.107
KILLARNEY	23	0.0649	0.0941	1.88	0.622	0.174	0.206	0.396	0.0284	0.0407	0.1105	0.261
BEAR ISLAND	24	0.0584	0.0888	1.40	0.515	0.114	0.191	0.180	0.0131	0.0564	0.1243	0.117
GOWGANDA	25	0.0550	0.0838	1.35	0.520	0.100	0.100	0.230	0.0100	0.0200	0.0500	0.156
RAMSEY	26	0.0578	0.0916	1.53	0.537	0.098	0.141	0.252	0.0188	0.0351	0.0810	0.150
MOONBEAM	27	0.0474	0.1034	1.58	0.555	0.365	0.246	0.380	0.0850	0.0286	0.1202	0.210
ATTAWAPISKAT	28	.	0.0277	1.20	0.420	.	.	0.340	.	.	.	0.152
WINISK	29	.	.	.	.	.	.	.	.	.	.	.
NAKINA	30	0.0365	0.0778	1.10	0.339	0.130	0.160	0.230	0.0249	0.0498	0.0995	0.175
DORION	31	0.0379	0.0651	1.25	0.377	0.081	0.131	0.145	0.0182	0.0250	0.0610	0.145
QUETICO CENTRE	32	0.0204	0.0450	0.69	0.205	0.040	0.084	0.330	0.0121	0.0368	0.0375	0.151
LAC LA CROIX	33	0.0209	.	1.10	0.320	.	0.140	.	.	.	.	0.332
E.L.A.	34	0.0537	.	3.75	0.690	2.180	0.270	.	0.0400	0.0950	0.2250	1.030
EAR FALLS	35	0.0316	0.0596	1.10	0.325	0.107	0.139	0.250	0.0170	0.0248	0.0757	0.229
PICKLE LAKE	36	0.0196	0.0608	0.52	0.190	0.100	0.099	0.114	0.0109	0.0219	0.0592	0.052

_____ Less then 2 values

. Missing

TABLE 3 (CONTINUED)
SEASONAL GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L)

SEASON = WINTER 81/82

	ID	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	0.0429	0.01005	0.000500	0.01521	0.0957	0.00884	0.00100	0.0977	0.00497	0.000264
MERLIN	2	0.0334	.	.	.	.	.	.	.	.	.
PORT STANLEY	3	0.2071	0.00802	0.000500	0.01602	0.0414	0.00127	0.00100	0.0736	0.00378	0.000454
WILKESPORT	4	0.0964	0.00711	0.000500	0.03283	0.1697	0.01191	0.00100	0.1467	0.00208	0.000200
ALVINSTON	5	0.0676	0.01682	0.000500	0.05907	0.2526	0.00339	0.00100	0.2535	0.00197	0.000161
HURON PARK	6	0.0120	.	.	.	.	.	.	.	.	.
WATERLOO	7	0.0380	0.01600	0.000500	.	.	0.01100	0.00100	.	0.00095	0.000200
PALMERSTON	8	0.0600	0.00849	0.000500	0.01169	0.0894	0.00553	0.00100	0.0569	0.00518	0.000233
SHALLOW LAKE	9	0.0291	0.00261	0.000500	0.00975	0.0602	0.00774	0.00100	0.0517	0.00315	0.000187
MILTON	10	0.0051	0.01700	0.000500	0.01635	0.1258	0.01600	0.00100	0.0797	0.00087	0.000100
UXBRIDGE	11	0.0096	0.00400	0.000500	0.01080	0.0539	0.00913	0.00100	0.0372	0.00476	0.000111
COLDWATER	12	0.0102	0.00157	0.000500	0.00384	0.0659	0.00503	0.00100	0.0346	0.00272	0.000050
CAMPBELLFORD	13	0.0158	0.00100	0.000500	0.02077	.	0.00300	0.00100	0.0429	0.00358	0.001400
KALADAR	14	0.0050	0.00600	0.000500	0.01593	0.0819	0.01400	0.00100	0.0468	0.00697	0.000300
SMITH'S FALLS	15	.	0.00600	0.000500	0.01534	0.0233	0.00600	0.00100	0.0144	0.00622	0.000050
DALHOUSIE MILLS	16	0.0160	0.00477	0.001074	0.01338	0.0368	0.00953	0.00177	0.0278	0.00457	0.000400
GOLDEN LAKE	17	0.0066	0.00107	0.001004	0.01342	0.0337	0.00519	0.00100	0.0232	0.00231	0.000050
WILBERFORCE	18	0.0040	0.00200	0.001000	0.03052	0.0483	0.01100	0.00100	0.0208	0.00276	.
WHITNEY	19	0.0105	0.00086	0.000500	0.00216	0.0206	0.00505	0.00100	0.0174	0.01329	0.000050
DORSET	20	0.0020	0.00096	0.000719	0.00414	0.0254	0.00597	0.00100	0.0161	0.00084	0.000063
MCKELLAR	21	0.0029	0.00118	0.000910	0.01018	0.0398	0.00882	0.00182	0.0169	0.00331	0.000118
MATTAWA	22	0.0060	0.00300	0.001000	0.00238	0.0303	0.00600	0.00100	0.0335	0.00469	0.000400
KILLARNEY	23	0.0096	.	.	.	.	.	.	.	.	.
BEAR ISLAND	24	0.0030	0.00050	0.000500	0.00497	0.0239	0.00800	0.00100	0.0684	0.00249	0.000050
GOWGANDA	25	0.0040	0.00050	0.000500	0.00918	0.0272	0.01000	0.00100	0.0300	0.00459	0.000050
RAMSEY	26	0.0043	0.00242	0.000500	0.02018	0.0583	0.00543	0.00100	0.0192	0.00229	0.000050
MOONBEAM	27	0.0050	.	.	.	.	.	.	.	.	.
ATTAWAPISKAT	28	0.0090	.	.	.	.	.	.	.	.	.
WINISK	29	.	.	.	.	.	.	.	.	.	.
NAKINA	30	0.0010	.	.	.	.	.	.	.	.	.
DORION	31	0.0025	0.00125	0.000500	0.00493	0.0253	0.00276	0.00100	0.0191	0.00165	0.000200
QUETICO CENTRE	32	0.0050	.	.	.	.	.	.	.	.	.
LAC LA CROIX	33	.	.	.	.	.	.	.	.	.	.
E.L.A.	34	.	.	.	.	.	.	.	.	.	.
EAR FALLS	35	0.0070	0.00400	0.000500	0.01095	0.0745	0.00700	0.00100	0.0569	0.00298	0.000500
PICKLE LAKE	36	0.0087	0.00219	0.000500	0.00669	0.0439	0.00403	0.00100	0.0173	0.00236	0.000546

_____ Less then 2 values

. Missing

TABLE 4 :
SEASONAL GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L)

SEASON = SPRING 82

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4
COLCHESTER	1	0.0755	0.0864	6.17	0.743	1.341	0.432	1.421	0.3762	0.0858	0.1761	0.910
MERLIN	2	0.0463	0.0814	3.96	0.697	0.998	0.389	0.915	0.1831	0.0496	0.1769	0.617
PORT STANLEY	3	0.0565	0.0958	6.06	0.958	1.224	0.334	1.149	0.2262	0.0489	0.1346	0.704
WILKESPORT	4	0.0343	0.0769	6.55	0.652	1.035	0.407	1.116	0.1276	0.0647	0.1527	0.837
ALVINSTON	5	0.0239	0.0588	5.81	0.706	1.507	0.379	0.841	0.2644	0.0721	0.1902	0.686
HURON PARK	6	0.0184	0.0548	7.35	0.777	1.281	0.565	1.415	0.2136	0.1008	0.1642	0.998
WATERLOO	7	0.0690	0.1111	5.36	0.958	0.731	0.314	0.974	0.1605	0.0428	0.1049	0.829
PALMERSTON	8	0.0692	0.1002	4.60	0.852	0.770	0.377	0.987	0.4050	0.0458	0.1802	0.808
SHALLOW LAKE	9	0.0489	0.0861	3.82	0.647	0.448	0.163	0.953	0.0854	0.0332	0.0554	0.689
MILTON	10	.	.	6.05	0.955	.	0.534	1.508	0.0500	0.1264	0.2263	0.906
UXBRIDGE	11	0.0708	0.1152	5.87	0.899	0.690	0.593	0.851	0.1587	0.0454	0.3575	0.660
COLDWATER	12	0.0656	0.1036	3.64	0.754	0.545	0.220	0.559	0.0664	0.0455	0.0826	0.419
CAMPBELLFORD	13	0.0690	0.0994	4.46	0.686	0.629	0.156	0.763	0.0569	0.0522	0.0649	0.600
KALADAR	14	0.1051	0.1243	5.19	0.687	0.344	0.219	0.628	0.0425	0.0481	0.1365	0.456
SMITH'S FALLS	15	0.0555	0.0784	4.37	0.711	0.867	0.216	0.596	0.3050	0.0413	0.1290	0.432
DALHOUSIE MILLS	16	0.0712	0.1007	4.70	0.924	1.037	0.339	0.812	0.0832	0.0810	0.2008	0.619
GOLDEN LAKE	17	0.0741	0.0951	5.14	0.607	0.314	0.122	0.743	0.0485	0.0284	0.0444	0.360
WILBERFORCE	18	0.0694	0.1093	3.67	0.655	0.353	0.146	0.519	0.0412	0.0437	0.0482	0.421
WHITNEY	19	0.0667	0.0975	3.51	0.573	0.318	0.124	0.607	0.0422	0.0424	0.0331	0.390
DORSET	20	0.0765	0.1088	4.14	0.697	0.457	0.161	0.616	0.0609	0.0433	0.0558	0.497
MCKELLAR	21	0.0930	0.1262	3.77	0.856	0.373	0.219	0.639	0.0412	0.0631	0.0873	0.520
MATTAWA	22	0.0846	0.1116	4.54	0.739	0.454	0.223	0.453	0.0579	0.0660	0.0890	0.562
KILLARNEY	23	0.1168	0.1372	5.06	0.899	0.343	0.170	0.701	0.0519	0.0320	0.0534	0.648
BEAR ISLAND	24	0.0959	0.1074	4.41	0.620	0.369	0.099	0.834	0.0560	0.0585	0.0526	0.556
GOWGANDA	25	0.0829	0.0958	3.49	0.388	0.204	0.090	0.596	0.0364	0.0421	0.0684	0.340
RAMSEY	26	0.0799	0.1051	4.36	0.546	0.319	0.111	0.643	0.0564	0.0417	0.0471	0.484
MOONBEAM	27	0.0576	0.0746	3.88	0.459	0.490	0.076	0.575	0.0831	0.0245	0.0457	0.480
ATTAWAPISKAT	28	.	0.0186	.	0.260	.	0.360	1.480	.	0.2600	0.2400	0.640
WINISK	29	.	.	.	.	.	.	.	.	.	.	.
NAKINA	30	0.0263	0.0298	2.63	0.335	0.220	0.124	1.117	0.0862	0.0592	0.0733	0.262
DORION	31	0.0452	0.0560	3.36	0.421	0.312	0.090	0.961	0.0487	0.0446	0.0557	0.619
QUETICO CENTRE	32	0.0161	0.0420	1.82	0.290	0.267	0.061	0.644	0.0308	0.0269	0.0237	0.441
LAC LA CROIX	33	0.0259	0.0435	2.09	0.319	0.234	0.076	0.780	0.0365	0.0508	0.0613	0.439
E.L.A.	34	0.0204	0.0466	2.86	0.445	0.457	0.091	0.861	0.0671	0.0500	0.0418	0.670
EAR FALLS	35	0.0087	0.0374	1.53	0.288	0.225	0.088	0.561	0.0371	0.0274	0.0670	0.321
PICKLE LAKE	36	0.0209	0.0406	1.84	0.288	0.261	0.049	0.776	0.0351	0.0340	0.0370	0.479

——— Less then 2 values

. Missing

TABLE 4 (CONTINUED)
SEASONAL GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L)

SEASON = SPRING 82

	ID	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	0.0668	0.00949	0.000565	0.01922	0.1299	0.00752	0.00100	0.1064	0.00272	0.000157
MERLIN	2	0.0611	0.00768	0.000500	0.01241	0.0778	0.00772	0.00100	0.1610	0.00322	0.000146
PORT STANLEY	3	0.0692	0.02302	0.000500	0.01227	0.1077	0.00775	0.00100	0.1371	0.00305	0.000500
WILKESPORT	4	0.0263	0.01001	0.000732	0.01791	0.1094	0.00756	0.00100	0.1152	0.00322	0.000394
ALVINSTON	5	0.0302	0.01385	0.000500	0.00709	0.1164	0.00527	0.00100	0.0989	0.00247	0.000100
HURON PARK	6	0.0830	0.00704	0.000500	0.01327	0.1613	0.00665	0.00100	0.1129	0.00135	0.000074
WATERLOO	7	0.0207	0.01133	0.000500	0.00582	0.0887	0.00942	0.00100	0.0837	0.00243	0.000136
PALMERSTON	8	0.0215	0.00573	0.000500	0.01235	0.0856	0.00640	0.00100	0.0754	0.00198	0.000227
SHALLOW LAKE	9	0.0360	0.00631	0.000500	0.00955	0.0508	0.00542	0.00100	0.0493	0.00165	0.000117
MILTON	10	0.0910	0.00755	0.000788	0.02045	0.1976	0.00385	0.00100	0.1416	0.00479	0.000142
UXBRIDGE	11	0.0164	0.00272	0.000500	0.01621	0.0615	0.00372	0.00100	0.0410	0.00332	0.000228
COLDWATER	12	0.0173	0.00682	0.000771	0.00972	0.0734	0.00591	0.00142	0.0872	0.00238	0.000119
CAMPBELLFORD	13	0.0239	0.00737	0.000500	0.00500	0.0709	0.00685	0.00100	0.0630	0.00210	0.000068
KALADAR	14	0.0195	0.00412	0.000500	0.00606	0.0484	0.00775	0.00100	0.0321	0.00246	0.000072
SMITH'S FALLS	15	0.0161	0.00983	0.000500	0.00824	0.0763	0.00850	0.00100	0.0614	0.00111	0.000183
DALHOUSIE MILLS	16	0.0167	0.00914	0.000809	0.01364	0.0826	0.01147	0.00100	0.0755	0.00702	0.000300
GOLDEN LAKE	17	0.0315	0.00370	0.000500	0.01076	0.0434	0.00680	0.00100	0.0354	0.00430	0.000139
WILBERFORCE	18	0.0183	0.00469	0.000674	0.00636	0.0543	0.00762	0.00135	0.0535	0.00156	0.000416
WHITNEY	19	0.0251	0.00396	0.000725	0.00517	0.0431	0.00499	0.00145	0.0468	0.00405	0.000118
DORSET	20	0.0187	0.00427	0.000500	0.00388	0.0623	0.00455	0.00100	0.0475	0.00090	0.000227
MCKELLAR	21	0.0088	0.00726	0.000584	0.00794	0.0611	0.01262	0.00117	0.0659	0.00281	0.000100
MATTAWA	22	0.0215	0.00722	0.000597	0.00848	0.0917	0.00883	0.00119	0.0854	0.00364	0.000151
KILLARNEY	23	0.0180	0.00482	0.000625	0.01094	0.0677	0.01053	0.00125	0.0859	0.00212	0.000179
BEAR ISLAND	24	0.0255	0.00636	0.000853	0.00850	0.1518	0.00941	0.00129	0.1202	0.00167	0.000437
GOWGANDA	25	0.0118	0.00400	0.001000	0.00675	0.0390	0.00500	0.00200	0.0264	0.00237	0.000100
RAMSEY	26	0.0230	0.00563	0.000910	0.00630	0.0580	0.00467	0.00127	0.0587	0.00216	0.000186
MOONBEAM	27	0.0095	0.00488	0.000639	0.01077	0.0574	0.00938	0.00128	0.0618	0.00255	0.000208
ATTAWAPISKAT	28	0.0950	0.00400	0.000500	0.01448	0.1210	0.00200	0.00100	0.0215	0.00261	0.000050
WINISK	29	.	.	.	.	.	.	.	.	.	.
NAKINA	30	0.0070	0.00657	0.000684	0.01365	0.1668	0.00664	0.00137	0.0591	0.00172	0.000214
DORION	31	0.0374	0.00268	0.001000	0.00563	0.0401	0.00299	0.00175	0.0324	0.00176	0.000125
QUETICO CENTRE	32	0.0166	0.00308	0.000842	0.00335	0.0191	0.00339	0.00138	0.0240	0.00205	0.000132
LAC LA CROIX	33	0.0255	0.00612	0.000765	0.01257	0.0912	0.00459	0.00153	0.0571	0.00391	0.000194
E.L.A.	34	0.0132	0.00833	0.000667	0.01111	0.0547	0.00267	0.00133	0.0564	0.00264	0.000247
EAR FALLS	35	0.0135	0.00300	0.000744	0.00741	0.0422	0.00507	0.00100	0.0342	0.00331	0.000300
PICKLE LAKE	36	0.0120	0.00333	0.001000	0.01178	0.0572	0.00452	0.00181	0.0315	0.00307	0.000119

_____ Less then 2 values

. Missing

TABLE 5 :
SEASONAL GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L)

SEASON = SUMMER 82

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4
COLCHESTER	1	0.1262	0.1413	8.98	0.839	0.763	0.289	1.430	0.2246	0.1018	0.0595	1.147
MERLIN	2	0.1127	0.1204	7.70	0.790	0.599	0.257	1.337	0.1244	0.0713	0.0342	0.880
PORT STANLEY	3	0.1264	0.1590	5.42	0.634	0.214	0.117	0.649	0.0469	0.0168	0.0170	0.569
WILKESPORT	4	0.0901	0.1098	6.26	0.708	0.725	0.243	1.078	0.1037	0.1154	0.0399	0.994
ALVINSTON	5	0.0817	0.0948	4.16	0.496	0.316	0.138	0.683	0.0707	0.2141	0.0380	0.545
HURON PARK	6	0.0771	0.0969	5.43	0.729	0.810	0.151	0.949	0.1352	0.0436	0.0283	0.808
WATERLOO	7	0.0697	0.0668	4.09	0.517	0.396	0.200	0.692	0.0887	0.1642	0.0555	0.519
PALMERSTON	8	0.0670	0.0846	3.80	0.485	0.272	0.094	0.620	0.0730	0.0292	0.0140	0.555
SHALLOW LAKE	9	0.0933	0.0925	3.43	0.455	0.192	0.053	0.552	0.0470	0.0486	0.0072	0.436
MILTON	10	0.0309	0.0540	6.74	0.802	.	0.256	0.750	.	0.1799	0.0368	0.774
UXBRIDGE	11	0.0505	0.0601	4.49	0.597	0.621	0.192	0.707	0.0860	0.0308	0.0365	0.554
COLDWATER	12	0.0699	0.0874	3.28	0.454	0.299	0.089	0.665	0.0479	0.1019	0.0318	0.517
CAMPBELLFORD	13	0.0630	0.0652	4.38	0.512	0.611	0.137	0.697	0.0744	0.0744	0.0395	0.494
KALADAR	14	0.0958	0.1091	4.15	0.521	0.179	0.118	0.546	0.0259	0.0365	0.0165	0.433
SMITH'S FALLS	15	0.0733	0.0865	4.18	0.482	0.423	0.100	0.497	0.1162	0.0619	0.0276	0.420
DALHOUSIE MILLS	16	0.0839	0.0950	4.30	0.465	0.322	0.121	0.676	0.0464	0.0689	0.0391	0.508
GOLDEN LAKE	17	0.0789	0.0928	3.62	0.477	0.192	0.100	0.625	0.0404	0.0554	0.0092	0.480
WILBERFORCE	18	0.0922	0.1069	3.94	0.511	0.175	0.093	0.488	0.0252	0.0507	0.0149	0.432
WHITNEY	19	0.0674	0.0838	3.07	0.363	0.154	0.076	0.406	0.0262	0.0546	0.0083	0.352
DORSET	20	0.0762	0.0880	3.23	0.395	0.101	0.075	0.431	0.0144	0.0139	0.0084	0.361
MCKELLAR	21	0.0866	0.0952	3.33	0.472	0.153	0.093	0.565	0.0203	0.0928	0.0178	0.434
MATTAWA	22	0.0637	0.0758	2.35	0.237	0.121	0.068	0.404	0.0296	0.0342	0.0161	0.299
KILLARNEY	23	0.0664	0.1015	4.07	0.339	0.143	0.089	0.381	0.0256	0.0594	0.0104	0.483
BEAR ISLAND	24	0.0449	0.0585	1.77	0.176	0.085	0.047	0.233	0.0324	0.0463	0.0148	0.167
GOWGANDA	25	0.0522	0.0638	2.08	0.235	0.103	0.083	0.369	0.0422	0.0814	0.0139	0.191
RAMSEY	26	0.0355	0.0510	1.50	0.188	0.085	0.054	0.259	0.0218	0.0366	0.0184	0.163
MOONBEAM	27	0.0358	0.0468	1.65	0.125	0.085	0.032	0.199	0.0236	0.0304	0.0152	0.118
ATTAWAPISKAT	28	0.0005	0.0338	0.57	0.060	0.133	0.383	1.816	0.1357	0.3038	0.2091	0.412
WINISK	29	0.0051	0.0270	0.59	0.065	0.177	0.650	0.176	0.0720	0.0415	0.4318	0.154
NAKINA	30	0.0106	0.0290	0.80	0.120	0.236	0.045	0.329	0.0457	0.0422	0.0231	0.194
DORION	31	0.0176	0.0356	0.96	0.169	0.119	0.040	0.297	0.0219	0.0341	0.0212	0.198
QUETICO CENTRE	32	0.0088	0.0280	0.99	0.178	0.160	0.054	0.424	0.0369	0.0391	0.0211	0.300
LAC LA CROIX	33	0.0044	0.0266	0.88	0.186	0.242	0.068	0.406	0.0430	0.0466	0.0304	0.320
E.L.A.	34	0.0118	0.0321	1.19	0.241	0.229	0.053	0.486	0.0425	0.0585	0.0252	0.305
EAR FALLS	35	0.0038	0.0290	0.84	0.151	0.153	0.067	0.529	0.0333	0.1250	0.0240	0.285
PICKLE LAKE	36	0.0051	0.0270	0.83	0.124	0.189	0.093	0.512	0.0336	0.0870	0.0231	0.319

_____ Less then 2 values

. Missing

TABLE 5 (CONTINUED)
SEASONAL GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L)

SEASON = SUMMER 82

	ID	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	0.0528	0.00677	0.000500	0.01329	0.0754	0.01159	0.00100	0.0511	0.00253	0.000388
MERLIN	2	0.0105	0.00456	0.000768	0.00735	0.0525	0.00741	0.00100	0.0326	0.00105	0.000076
PORT STANLEY	3	0.0041	0.00242	0.000500	0.00638	0.0243	0.00582	0.00252	0.0141	0.00110	0.000189
WILKESPORT	4	0.0424	0.00558	0.000733	0.01071	0.0564	0.00958	0.00100	0.0552	0.00195	0.000199
ALVINSTON	5	0.0160	0.00305	0.000500	0.01105	0.0253	0.00374	0.00100	0.0169	0.00133	0.000065
HURON PARK	6	0.0132	0.00535	0.000500	0.00978	0.0492	0.00775	0.00100	0.0344	0.00092	0.000081
WATERLOO	7	0.0645	0.00502	0.000500	0.00870	0.0456	0.00380	0.00100	0.0283	0.00110	0.000124
PALMERSTON	8	0.0059	0.00867	0.001101	0.00818	0.0245	0.02285	0.00140	0.0202	0.00263	0.000190
SHALLOW LAKE	9	0.0075	0.00215	0.000500	0.00576	0.0467	0.00348	0.00100	0.0297	0.00133	0.000066
MILTON	10	0.0268	0.01307	0.000500	0.01081	0.0749	0.00851	0.00100	0.0366	0.00113	0.000078
UXBRIDGE	11	0.0083	0.00314	0.000500	0.00754	0.0273	0.00530	0.00100	0.0167	0.00126	0.000067
COLDWATER	12	0.0222	0.00280	0.000500	0.00518	0.0305	0.00647	0.00100	0.0193	0.00105	0.000057
CAMPBELLFORD	13	0.0109	0.00304	0.000500	0.00912	0.0506	0.00437	0.00100	0.0354	0.00209	0.000088
KALADAR	14	0.0177	0.00348	0.000728	0.00630	0.0708	0.00877	0.00100	0.0670	0.00248	0.000050
SMITH'S FALLS	15	0.0059	0.00221	0.000500	0.00466	0.0279	0.00635	0.00100	0.0126	0.00090	0.000082
DALHOUSIE MILLS	16	0.0113	0.00353	0.000500	0.00648	0.0385	0.00836	0.00100	0.0252	0.00133	0.000110
GOLDEN LAKE	17	0.0093	0.00298	0.000500	0.00621	0.0264	0.00720	0.00100	0.0094	0.00132	0.000066
WILBERFORCE	18	0.0053	0.00211	0.000500	0.00626	0.0210	0.00746	0.00100	0.0135	0.00101	0.000050
WHITNEY	19	0.0056	0.00183	0.000500	0.00526	0.0169	0.00382	0.00100	0.0155	0.00113	0.000050
DORSET	20	0.0025	0.00157	0.000500	0.00382	0.0152	0.00602	0.00100	0.0099	0.00078	0.000050
MCKELLAR	21	0.0020	0.00225	0.000655	0.00428	0.0270	0.00544	0.00100	0.0128	0.00102	0.000050
MATTAWA	22	0.0049	0.00198	0.000500	0.00378	0.0362	0.00346	0.00100	0.0237	0.00108	0.000050
KILLARNEY	23	0.0037	0.00160	0.000603	0.00533	0.0287	0.00568	0.00100	0.0234	0.00125	0.000050
BEAR ISLAND	24	0.0064	0.00180	0.000581	0.00394	0.0135	0.00207	0.00100	0.0074	0.00103	0.000074
GOWGANDA	25	0.0113	0.00175	0.000831	0.00321	0.0122	0.00171	0.00100	0.0074	0.00132	0.000127
RAMSEY	26	0.0076	0.00169	0.000526	0.00296	0.0137	0.00140	0.00100	0.0119	0.00102	0.000058
MOONBEAM	27	0.0049	0.00115	0.000500	0.00196	0.0144	0.00083	0.00100	0.0095	0.00092	0.000050
ATTAWAPISKAT	28	0.1525	0.00261	0.000500	0.00356	0.0361	0.00050	0.00100	0.0115	0.00097	0.000050
WINISK	29	0.0060	0.00095	0.000500	0.00347	0.0163	0.00154	0.00100	0.0096	0.00088	0.000065
NAKINA	30	0.0121	0.00128	0.000500	0.00414	0.0153	0.00165	0.00100	0.0160	0.00103	0.000050
DORION	31	0.0056	0.00275	0.000500	0.00330	0.0135	0.00050	0.00100	0.0152	0.00169	0.000075
QUETICO CENTRE	32	0.0093	0.00366	0.000500	0.00258	0.0294	0.00202	0.00100	0.0208	0.00096	0.000055
LAC LA CROIX	33	0.0146	0.00442	0.000500	0.00452	0.0643	0.00086	0.00100	0.0476	0.00133	0.000055
E.L.A.	34	0.0166	0.00436	0.000500	0.00217	0.0340	0.00148	0.00100	0.0291	0.00128	0.000050
EAR FALLS	35	0.0359	0.00990	0.000500	0.00851	0.0363	0.00169	0.00100	0.0238	0.00125	0.000069
PICKLE LAKE	36	0.0244	0.00331	0.000500	0.00433	0.0360	0.00236	0.00100	0.0494	0.00202	0.000129

_____ Less then 2 values

. Missing

TABLE 6 :
SEASONAL GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L)

SEASON = AUTUMN 82

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4
COLCHESTER	1	0.0611	0.0815	3.40	0.415	0.366	0.222	0.461	0.1067	0.0308	0.0887	0.361
MERLIN	2	0.0415	0.0677	2.85	0.361	0.424	0.156	0.443	0.0943	0.0192	0.0789	0.303
PORT STANLEY	3	0.0710	0.0843	2.75	0.406	0.242	0.145	0.338	0.0431	0.0379	0.0732	0.255
WILKESPORT	4	0.0637	0.0853	3.31	0.424	0.346	0.194	0.448	0.0512	0.0357	0.1060	0.374
ALVINSTON	5	0.0574	0.0762	2.91	0.440	0.291	0.194	0.466	0.0494	0.0836	0.1033	0.346
HURON PARK	6	0.0540	0.0769	3.40	0.474	0.452	0.150	0.555	0.1286	0.0523	0.0911	0.456
WATERLOO	7	0.0673	0.0917	4.49	0.636	0.394	0.156	0.977	0.0902	0.0916	0.0676	0.820
PALMERSTON	8	0.0465	0.0597	2.87	0.400	0.245	0.125	0.730	0.0630	0.0640	0.0592	0.626
SHALLOW LAKE	9	0.0483	0.0817	2.70	0.487	0.202	0.201	0.621	0.0414	0.0783	0.0863	0.426
MILTON	10	0.0468	0.0725	4.09	0.611	0.620	0.244	0.774	0.2600	0.1143	0.0421	0.393
UXBRIDGE	11	0.0604	0.0821	2.49	0.380	0.195	0.091	0.416	0.0327	0.0400	0.0600	0.299
COLDWATER	12	0.0491	0.0681	2.31	0.353	0.144	0.134	0.377	0.0213	0.0230	0.0390	0.302
CAMPBELLFORD	13	0.0926	0.1024	2.98	0.479	0.196	0.130	0.371	0.0206	0.0169	0.0463	0.319
KALADAR	14	0.0900	0.1044	3.10	0.522	0.232	0.091	0.366	0.0364	0.0227	0.0414	0.315
SMITH'S FALLS	15	0.0647	0.0824	3.64	0.572	0.440	0.159	0.470	.	0.0300	0.0596	0.383
DALHOUSIE MILLS	16	0.0683	0.0859	2.99	0.477	0.355	0.110	0.459	0.0343	0.0353	0.0417	0.355
GOLDEN LAKE	17	0.0658	0.0813	2.24	0.388	0.144	0.092	0.331	0.0283	0.0183	0.0336	0.245
WILBERFORCE	18	0.0504	0.0741	2.34	0.411	0.125	0.129	0.295	0.0208	0.0175	0.0404	0.229
WHITNEY	19	0.0539	0.0772	2.21	0.363	0.118	0.103	0.298	0.0183	0.0157	0.0371	0.213
DORSET	20	0.0614	0.0833	2.50	0.423	0.150	0.126	0.305	0.0220	0.0078	0.0454	0.274
MCKELLAR	21	0.0616	0.0890	2.69	0.439	0.145	0.152	0.377	0.0243	0.0500	0.0832	0.292
MATTAWA	22	0.0602	0.0761	2.53	0.471	0.156	0.103	0.361	0.0270	0.0314	0.0591	0.310
KILLARNEY	23	0.0952	0.1067	3.67	0.690	0.291	0.145	0.299	0.0425	0.0393	0.0640	0.450
BEAR ISLAND	24	0.0697	0.0898	2.82	0.412	0.204	0.094	0.444	0.0439	0.0152	0.0422	0.210
GOWGANDA	25	0.0708	0.0976	2.70	0.300	0.090	0.100	0.400	0.0200	0.0400	0.0700	0.214
RAMSEY	26	0.0469	0.0644	1.79	0.263	0.089	0.067	0.244	0.0143	0.0358	0.0453	0.169
MOONBEAM	27	0.0221	0.0478	1.51	0.184	0.156	0.070	0.346	0.0210	0.0423	0.0553	0.246
ATTAWAPISKAT	28	0.0083	0.0339	0.90	0.220	0.180	0.220	0.435	0.0500	0.2657	0.1350	0.188
WINISK	29	0.0027	0.0247	1.46	0.153	0.584	0.980	0.152	0.1500	0.0768	0.6300	0.074
NAKINA	30	0.0106	0.0472	1.69	0.190	0.238	0.083	0.555	0.0312	0.0588	0.0652	0.395
DORION	31	0.0344	0.0635	2.04	0.237	0.223	0.034	0.440	0.0286	0.0349	0.0485	0.305
QUETICO CENTRE	32	0.0204	0.0465	1.27	0.198	0.155	0.046	0.391	0.0167	0.0415	0.0324	0.265
LAC LA CROIX	33	0.0214	0.0418	1.28	0.223	0.194	0.102	0.522	0.0250	0.0971	0.0661	0.194
E.L.A.	34	0.0120	0.0403	1.22	0.161	0.247	0.061	0.352	0.0260	0.0474	0.0545	0.252
EAR FALLS	35	0.0087	0.0432	1.47	0.190	0.278	0.111	0.499	0.0350	0.1007	0.1015	0.307
PICKLE LAKE	36	0.0184	0.0460	1.30	0.164	0.120	0.104	0.570	0.0208	0.0338	0.0501	0.276

——— Less then 2 values

. Missing

TABLE 6 (CONTINUED)
SEASONAL GAUGE DEPTH WEIGHTED MEAN CONCENTRATION(MG/L)

SEASON = AUTUMN 82

	ID	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	0.0095	0.00224	0.000500	0.00664	0.0239	0.00962	0.00100	0.0205	0.00090	0.000050
MERLIN	2	0.0190	0.00319	0.000500	0.00594	0.0300	0.00744	0.00100	0.0237	0.00123	0.000050
PORT STANLEY	3	0.0151	0.00155	0.000500	0.00352	0.0171	0.00610	0.00100	0.0164	0.00091	0.000119
WILKESPORT	4	0.0090	0.00200	0.000500	0.00575	0.0290	0.00410	0.00160	0.0238	0.00130	0.000050
ALVINSTON	5	0.0179	0.00223	0.000500	0.01029	0.0479	0.00575	0.00100	0.0307	0.00197	0.000100
HURON PARK	6	0.0118	0.00250	0.000671	0.00984	0.0395	0.00950	0.00100	0.0294	0.00072	0.000050
WATERLOO	7	0.0364	0.00326	0.000871	0.00890	0.0370	0.01197	0.00100	0.0243	0.00136	0.000200
PALMERSTON	8	0.0245	0.00133	0.000500	0.00426	0.0202	0.00494	0.00100	0.0173	0.00071	0.000050
SHALLOW LAKE	9	0.0214	0.00151	0.000500	0.00494	0.0178	0.00394	0.00100	0.0148	0.00082	0.000050
MILTON	10	0.0439	0.00471	0.000643	0.01079	0.0343	0.01357	0.00100	0.0244	0.00099	0.000171
UXBRIDGE	11	0.0168	0.00100	0.000500	0.00352	0.0166	0.00610	0.00100	0.0110	0.00125	0.000246
COLDWATER	12	0.0101	0.00104	0.000500	0.00280	0.0129	0.00571	0.00100	0.0097	0.00070	0.000050
CAMPBELLFORD	13	0.0065	0.00100	0.000500	0.00376	0.0121	0.00700	0.00100	0.0096	.	0.000100
KALADAR	14	0.0029	0.00155	0.000500	0.00422	0.0171	0.00727	0.00100	0.0147	0.00095	0.000077
SMITH'S FALLS	15	0.0078	0.00351	0.000500	0.00565	0.0230	0.00956	0.00100	0.0167	0.00099	0.000075
DALHOUSIE MILLS	16	0.0146	0.00307	0.000500	0.00844	0.0334	0.01055	0.00100	0.0157	0.00156	0.000067
GOLDEN LAKE	17	0.0079	0.00115	0.000500	0.00485	0.0188	0.00639	0.00100	0.0107	0.00089	0.000108
WILBERFORCE	18	0.0035	0.00066	0.000500	0.00276	0.0101	0.00547	0.00100	0.0097	0.00066	0.000050
WHITNEY	19	0.0064	0.00092	0.000500	0.00340	0.0145	0.00591	0.00155	0.0073	0.00085	0.000050
DORSET	20	0.0033	0.00117	0.000500	0.00293	0.0126	0.00612	0.00100	0.0097	0.00071	0.000050
MCKELLAR	21	0.0046	0.00113	0.000500	0.00528	0.0248	0.00286	0.00100	0.0129	0.00092	0.000063
MATTAWA	22	0.0074	0.00330	0.001156	0.00451	0.0304	0.00687	0.00100	0.0186	0.00206	0.000050
KILLARNEY	23	0.0054	0.00294	0.000500	0.00611	0.0355	0.00837	0.00100	0.0274	0.00098	0.000060
BEAR ISLAND	24	0.0054	0.00377	0.000851	0.00677	0.0215	0.00471	0.00100	0.0234	0.00092	0.000085
GOWGANDA	25	0.0020	0.00100	0.000500	0.00848	0.0267	0.00800	0.00100	0.0189	0.00148	0.000100
RAMSEY	26	0.0034	0.00100	0.000500	0.00360	0.0256	0.00190	0.00100	0.0338	0.00091	0.000050
MOONBEAM	27	0.0044	0.00130	0.000500	0.01263	0.0087	0.00579	0.00100	0.0112	0.00258	0.000367
ATTAWAPISKAT	28	0.0164	0.00548	0.000500	0.01712	0.0703	0.00245	0.00100	0.0492	0.00341	0.000548
WINISK	29	0.0054	0.00157	0.000500	0.01096	0.0512	0.00113	0.00100	0.0240	0.00184	0.000182
NAKINA	30	0.0233	0.00249	0.000500	0.00594	0.0444	0.00249	0.00100	0.0335	0.00097	0.000093
DORION	31	0.0052	0.00225	0.000500	0.00224	0.0316	0.00581	0.00100	0.0330	0.00090	0.000050
QUETICO CENTRE	32	0.0076	0.00129	0.000500	0.00354	0.0210	0.00587	0.00100	0.0220	0.00099	0.000064
LAC LA CROIX	33	0.0137	0.00327	0.000500	0.00728	0.0330	0.00542	0.00100	0.0127	0.00119	0.000268
E.L.A.	34	0.0053	0.00390	0.000500	0.00348	0.0699	0.00461	0.00100	0.0817	0.00080	0.000055
EAR FALLS	35	0.0182	0.00300	0.001740	0.00394	0.0473	0.00465	0.00100	0.0699	0.00371	0.000050
PICKLE LAKE	36	0.0182	0.00148	0.000500	0.00962	0.0465	0.00426	0.00100	0.0291	0.00187	0.000111

_____ **Less then 2 values**

. **Missing**

TABLE 7 :
SEASONAL DEPOSITION (MG/M**2)

SEASON = WINTER 81/82

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	7.8	15.3	507	104.9	135.5	127.9	70.2	36.0	21.3	74.2	35.4	7.1	1.67	0.1	2.53	15.9	1.47	0.166	16.2	0.83	0.044
MERLIN	2	25.4	14.8	699	128.9	119.3	143.1	86.7	89.4	17.5	89.7	41.4	6.4	.	.	.	.	.	.	.	.	.
PORT STANLEY	3	23.2	6.2	606	97.6	.	96.4	119.0	68.6	23.1	51.9	21.7	29.0	1.12	0.1	2.24	5.8	0.18	0.140	10.3	0.53	0.064
WILKESPORT	4	2.9	6.3	374	79.3	130.5	69.5	59.3	15.1	14.0	37.3	33.1	11.8	0.87	0.1	4.01	20.7	1.45	0.122	17.9	0.25	0.024
ALVINSTON	5	0.1	6.7	629	151.4	296.2	99.7	61.6	56.3	26.9	49.9	17.6	10.9	2.71	0.1	9.51	40.7	0.55	0.161	40.8	0.32	0.026
HURON PARK	6	16.7	25.9	865	246.5	178.3	90.9	153.8	28.0	25.3	69.9	127.6	2.1	.	.	.	.	.	.	.	.	.
WATERLOO	7	14.5	8.0	500	115.0	143.7	51.2	125.3	50.1	10.5	22.8	87.7	6.3	2.67	0.1	.	.	1.84	0.167	.	0.16	0.033
PALMERSTON	8	6.8	7.1	686	111.2	158.4	106.1	.	52.8	14.7	40.4	100.9	9.3	1.32	0.1	1.82	13.9	0.86	0.155	8.8	0.80	0.036
SHALLOW LAKE	9	12.6	17.7	509	144.7	64.3	62.6	69.4	18.2	8.9	31.6	85.1	6.4	0.58	0.1	2.15	13.3	1.71	0.221	11.[illegible]	0.70	0.041
MILTON	10	.	4.2	455	119.8	.	318.8	71.6	.	8.7	69.3	45.1	0.6	2.14	0.1	2.06	15.9	2.02	0.126	10.0	0.11	0.013
UXBRIDGE	11	6.6	12.8	380	79.8	110.3	105.0	87.0	6.7	2.2	40.9	46.1	1.5	0.63	0.1	1.69	8.4	1.43	0.157	5.8	0.75	0.017
COLDWATER	12	5.5	10.6	132	57.3	26.0	36.4	40.4	3.1	2.0	14.4	19.5	1.7	0.26	0.1	0.63	10.8	0.83	0.164	5.7	0.45	0.008
CAMPBELLFORD	13	4.3	6.5	225	66.4	70.7	33.9	38.5	6.2	8.8	18.9	28.0	2.1	0.13	0.1	2.79	.	0.40	0.134	5.8	0.48	0.188
KALADAR	14	4.0	20.1	101	36.9	13.9	33.6	86.9	2.0	3.5	9.4	24.1	0.7	0.83	0.1	2.20	11.3	1.93	0.138	6.5	0.96	0.041
SMITH'S FALLS	15	3.2	5.2	189	58.3	87.7	51.2	40.0	24.0	12.5	35.4	19.8	.	0.69	0.1	1.75	2.7	0.69	0.114	1.6	0.71	0.006
DALHOUSIE MILLS	16	4.5	9.4	170	65.0	40.4	31.1	32.3	3.7	9.7	15.9	31.5	2.0	0.58	0.1	1.64	4.5	1.17	0.216	3.4	0.56	0.049
GOLDEN LAKE	17	6.1	11.8	166	60.8	20.8	21.0	30.6	4.6	4.5	12.9	17.6	1.0	0.16	0.1	1.98	5.0	0.77	0.148	3.4	0.34	0.007
WILBERFORCE	18	7.3	12.4	191	65.0	17.7	22.2	35.6	1.6	2.9	8.2	25.5	0.5	0.27	0.1	4.18	6.6	1.51	0.137	2.9	0.38	.
WHITNEY	19	4.5	8.9	87	47.8	7.8	16.6	38.6	0.4	1.1	3.2	19.2	1.6	0.13	0.1	0.33	3.1	0.77	0.152	2.6	2.02	0.008
DORSET	20	10.6	16.8	251	99.6	22.7	34.9	48.2	2.6	2.0	10.0	31.3	0.4	0.17	0.1	0.74	4.5	1.06	0.178	2.9	0.15	0.011
MCKELLAR	21	7.4	13.8	231	84.8	19.8	61.5	69.9	2.5	10.3	43.8	47.8	0.5	0.22	0.2	1.88	7.4	1.63	0.337	3.1	0.61	0.022
MATTAWA	22	7.1	12.3	172	86.5	35.4	74.8	25.6	3.8	7.8	56.1	15.2	0.9	0.43	0.1	0.34	4.3	0.85	0.142	4.8	0.67	0.057
KILLARNEY	23	8.5	12.3	246	81.5	22.7	27.0	51.9	3.7	5.3	14.5	34.2	1.3	.	.	.	.	.	.	.	.	.
BEAR ISLAND	24	6.5	9.9	155	57.2	12.7	21.2	20.0	1.5	6.3	13.8	13.0	0.3	0.06	0.1	0.55	2.7	0.89	0.111	7.6	0.28	0.006
GOWGANDA	25	6.5	9.9	160	61.7	11.9	11.9	27.3	1.2	2.4	5.9	18.5	0.5	0.06	0.1	1.09	3.2	1.19	0.119	3.6	0.54	0.006
RAMSEY	26	4.7	7.5	125	44.0	8.0	11.6	20.6	1.5	2.9	6.6	12.3	0.4	0.20	0.0	1.65	4.8	0.45	0.082	1.6	0.19	0.004
MOONBEAM	27	4.4	9.6	146	51.5	33.8	22.8	35.3	7.9	2.7	11.2	19.5	0.5	.	.	.	.	.	.	.	.	.
ATTAWAPISKAT	28	.	2.4	106	37.0	.	.	30.0	.	.	.	13.4	0.8	.	.	.	.	.	.	.	.	.
WINISK	29	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NAKINA	30	2.0	4.2	60	18.5	7.1	8.7	12.5	1.4	2.7	5.4	9.6	0.1	.	.	.	.	.	.	.	.	.
DORION	31	3.4	5.8	112	33.8	7.2	11.7	13.0	1.6	2.2	5.5	13.0	0.2	0.11	0.0	0.44	2.3	0.25	0.089	1.7	0.15	0.018
QUETICO CENTRE	32	1.3	2.8	42	12.6	2.5	5.2	20.4	0.7	2.3	2.3	9.3	0.3	.	.	.	.	.	.	.	.	.
LAC LA CROIX	33	0.2	.	13	3.6	.	1.6	.	.	.	.	3.8	.	.	.	.	.	.	.	.	.	.
E.L.A.	34	2.4	.	168	30.9	8.1	12.1	.	1.8	4.3	10.1	46.1	.	.	.	.	.	.	.	.	.	.
EAR FALLS	35	1.2	2.3	43	12.7	4.2	5.4	9.8	0.7	1.0	3.0	8.9	0.3	0.16	0.0	0.43	2.9	0.27	0.039	2.2	0.12	0.019
PICKLE LAKE	36	2.0	6.3	54	19.7	10.4	10.3	11.8	1.1	2.3	6.1	5.4	0.9	0.23	0.1	0.69	4.5	0.42	0.104	1.8	0.24	0.057

——— **Less then 2 values**

. **Missing**

TABLE 8 :
SEASONAL DEPOSITION (MG/M**2)

SEASON = SPRING 82

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	9.3	10.6	758	91.4	165.0	53.1	174.8	46.3	10.6	21.7	111.9	8.2	1.17	0.1	2.36	16.0	0.92	0.123	13.1	0.33	0.019
MERLIN	2	5.5	9.6	466	82.1	117.6	45.9	107.8	21.6	5.8	20.8	72.6	7.2	0.90	0.1	1.46	9.2	0.91	0.118	19.0	0.38	0.017
PORT STANLEY	3	9.3	15.7	991	156.7	200.3	54.7	187.9	37.0	8.0	22.0	115.1	11.3	3.77	0.1	2.01	17.6	1.27	0.164	22.4	0.50	0.082
WILKESPORT	4	3.3	7.5	636	63.2	100.4	39.5	108.3	12.4	6.3	14.8	81.2	2.6	0.97	0.1	1.74	10.6	0.73	0.097	11.2	0.31	0.038
ALVINSTON	5	3.3	8.2	808	98.2	209.5	52.6	116.9	36.8	10.0	26.4	95.4	4.2	1.92	0.1	0.99	16.2	0.73	0.139	13.8	0.34	0.014
HURON PARK	6	2.3	6.8	915	96.7	159.4	70.4	176.2	26.6	12.5	20.4	124.3	10.3	0.88	0.1	1.65	20.1	0.83	0.124	14.1	0.17	0.009
WATERLOO	7	10.2	16.4	793	141.8	108.2	46.5	144.2	23.8	6.3	15.5	122.8	3.1	1.68	0.1	0.86	13.1	1.39	0.148	12.4	0.36	0.020
PALMERSTON	8	11.4	16.5	756	140.2	126.7	62.0	162.4	66.6	7.5	29.6	132.9	3.5	0.94	0.1	2.03	14.1	1.05	0.164	12.4	0.33	0.037
SHALLOW LAKE	9	8.8	15.4	684	115.8	80.2	29.2	170.7	15.3	5.9	9.9	123.4	6.4	1.13	0.1	1.71	9.1	0.97	0.179	8.8	0.30	0.021
MILTON	10	.	.	1055	166.5	.	93.1	262.9	8.7	22.0	39.4	158.0	15.9	1.32	0.1	3.56	34.4	0.67	0.174	24.7	0.83	0.025
UXBRIDGE	11	13.0	21.1	1075	164.6	126.4	108.6	155.9	29.1	8.3	65.5	120.8	3.0	0.50	0.1	2.97	11.3	0.68	0.183	7.5	0.61	0.042
COLDWATER	12	10.3	16.3	572	118.4	85.6	34.6	87.8	10.4	7.1	13.0	65.8	2.7	1.07	0.1	1.53	11.5	0.93	0.223	13.7	0.37	0.019
CAMPBELLFORD	13	12.2	17.6	788	121.3	111.1	27.5	134.8	10.1	9.2	11.5	106.1	4.2	1.30	0.1	0.88	12.5	1.21	0.177	11.1	0.37	0.012
KALADAR	14	21.4	25.3	1055	139.6	69.9	44.5	127.7	8.6	9.8	27.7	92.6	4.0	0.84	0.1	1.23	9.8	1.58	0.203	6.5	0.50	0.015
SMITH'S FALLS	15	6.5	9.2	514	83.5	101.9	25.3	70.0	35.8	4.8	15.2	50.8	1.9	1.16	0.1	0.97	9.0	1.00	0.117	7.2	0.13	0.022
DALHOUSIE MILLS	16	9.0	12.7	592	116.4	130.6	42.6	102.3	10.5	10.2	25.3	77.9	2.1	1.15	0.1	1.72	10.4	1.44	0.126	9.5	0.88	0.038
GOLDEN LAKE	17	8.4	10.7	580	68.5	35.4	13.8	83.9	5.5	3.2	5.0	40.6	3.6	0.42	0.1	1.21	4.9	0.77	0.113	4.0	0.49	0.016
WILBERFORCE	18	15.0	23.6	794	141.5	76.2	31.6	112.2	8.9	9.4	10.4	90.9	4.0	1.01	0.1	1.37	11.7	1.65	0.291	11.6	0.34	0.090
WHITNEY	19	8.7	12.8	460	75.1	41.7	16.2	79.5	5.5	5.5	4.3	51.1	3.3	0.52	0.1	0.68	5.6	0.65	0.190	6.1	0.53	0.015
DORSET	20	13.3	18.9	720	121.2	79.4	28.0	107.1	10.6	7.5	9.7	86.6	3.2	0.74	0.1	0.68	10.8	0.79	0.174	8.3	0.16	0.040
MCKELLAR	21	13.5	18.4	549	124.5	54.2	31.9	93.0	6.0	9.2	12.7	75.6	1.3	1.06	0.1	1.16	8.9	1.84	0.170	9.6	0.41	0.015
MATTAWA	22	8.7	11.5	467	76.1	46.8	22.9	46.7	6.0	6.8	9.2	57.9	2.2	0.74	0.1	0.87	9.4	0.91	0.123	8.8	0.37	0.016
KILLARNEY	23	14.0	16.5	607	107.9	41.2	20.4	84.1	6.2	3.8	6.4	77.8	2.2	0.58	0.1	1.31	8.1	1.26	0.150	10.3	0.25	0.021
BEAR ISLAND	24	9.3	10.4	426	59.8	35.6	9.6	80.5	5.4	5.6	5.1	53.7	2.5	0.61	0.1	0.82	14.6	0.91	0.125	11.6	0.16	0.042
GOWGANDA	25	5.1	5.9	213	23.8	12.5	5.5	36.5	2.2	2.6	4.2	20.8	0.7	0.24	0.1	0.41	2.4	0.31	0.122	1.6	0.15	0.006
RAMSEY	26	9.0	11.9	492	61.5	36.0	12.5	72.5	6.4	4.7	5.3	54.6	2.6	0.63	0.1	0.71	6.5	0.53	0.144	6.6	0.24	0.021
MOONBEAM	27	5.6	7.2	376	44.5	47.6	7.4	55.7	8.1	2.4	4.4	46.6	0.9	0.47	0.1	1.05	5.6	0.91	0.124	6.0	0.25	0.020
ATTAWAPISKAT	28	.	3.4	.	48.0	.	66.5	273.5	.	48.0	44.4	118.3	17.6	0.74	0.1	2.68	22.4	0.37	0.185	4.0	0.48	0.009
WINISK	29	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.	.
NAKINA	30	3.3	3.8	334	42.6	28.0	15.8	142.1	11.0	7.5	9.3	33.3	0.9	0.84	0.1	1.71	21.2	0.84	0.174	7.5	0.22	0.027
DORION	31	7.7	9.5	571	71.5	52.9	15.3	163.0	8.3	7.6	9.5	105.0	6.3	0.46	0.2	0.95	6.8	0.51	0.297	5.5	0.30	0.021
QUETICO CENTRE	32	2.8	7.3	319	50.7	46.7	10.7	112.6	5.4	4.7	4.1	77.2	2.9	0.54	0.1	0.59	3.3	0.59	0.241	4.2	0.36	0.023
LAC LA CROIX	33	3.9	6.5	312	47.6	35.0	11.3	116.5	5.4	7.6	9.2	65.6	3.8	0.91	0.1	1.88	13.6	0.69	0.229	8.5	0.58	0.029
E.L.A.	34	2.1	4.8	297	46.2	47.5	9.5	89.3	7.0	5.2	4.3	69.6	1.4	0.86	0.1	1.15	5.7	0.28	0.138	5.9	0.27	0.026
EAR FALLS	35	1.2	5.1	208	39.1	30.5	12.0	76.1	5.0	3.7	9.1	43.6	1.8	0.41	0.1	1.00	5.7	0.69	0.136	4.6	0.45	0.041
PICKLE LAKE	36	3.2	6.2	281	44.0	39.9	7.5	118.5	5.4	5.2	5.7	73.1	1.8	0.51	0.2	1.80	8.7	0.69	0.276	4.8	0.47	0.018

——— Less then 2 values

• Missing

TABLE 9 :
SEASONAL DEPOSITION (MG/M**2)

SEASON = SUMMER 82

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	26.4	29.6	1880	175.5	159.7	60.4	299.3	47.0	21.3	12.4	240.1	11.1	1.42	0.1	2.78	15.8	2.43	0.209	10.7	0.53	0.081
MERLIN	2	25.8	27.6	1764	181.0	137.1	58.9	306.1	28.5	16.3	7.8	201.6	2.4	1.04	0.2	1.68	12.0	1.70	0.229	7.5	0.24	0.017
PORT STANLEY	3	42.9	53.9	1837	214.8	72.4	39.6	220.1	15.9	5.7	5.8	192.9	1.4	0.82	0.2	2.16	8.2	1.97	0.855	4.8	0.37	0.064
WILKESPORT	4	21.3	25.9	1477	167.1	171.1	57.2	254.4	24.5	27.2	9.4	234.6	10.0	1.32	0.2	2.53	13.3	2.26	0.236	13.0	0.46	0.047
ALVINSTON	5	22.4	26.0	1139	136.0	86.7	37.8	187.1	19.4	58.7	10.4	149.5	4.4	0.83	0.1	3.03	6.9	1.02	0.274	4.6	0.36	0.018
HURON PARK	6	26.0	32.6	1828	245.6	272.6	50.8	319.5	45.5	14.7	9.5	272.0	4.4	1.80	0.2	3.29	16.6	2.61	0.337	11.6	0.31	0.027
WATERLOO	7	26.4	25.3	1549	195.9	149.9	75.8	262.4	33.6	62.2	21.0	196.5	24.4	1.90	0.2	3.30	17.3	1.44	0.379	10.7	0.42	0.047
PALMERSTON	8	22.9	28.9	1300	165.9	92.9	32.2	212.1	25.0	10.0	4.8	189.9	2.0	2.96	0.4	2.80	8.4	7.81	0.479	6.9	0.90	0.065
SHALLOW LAKE	9	30.5	30.2	1119	148.3	62.5	17.1	180.0	15.3	15.8	2.3	142.1	2.5	0.70	0.2	1.88	15.2	1.14	0.326	9.7	0.44	0.021
MILTON	10	10.9	19.1	2383	283.4	.	90.4	265.0	.	63.6	13.0	273.5	9.5	4.62	0.2	3.82	26.5	3.01	0.353	12.9	0.40	0.028
UXBRIDGE	11	14.3	17.0	1271	169.1	175.8	54.2	200.1	24.3	8.7	10.3	156.7	2.3	0.89	0.1	2.13	7.7	1.50	0.283	4.7	0.36	0.019
COLDWATER	12	23.1	28.8	1084	149.8	98.8	29.3	219.4	15.8	33.6	10.5	170.8	7.3	0.92	0.2	1.71	10.1	2.13	0.330	6.4	0.35	0.019
CAMPBELLFORD	13	19.0	19.6	1319	154.1	184.1	41.1	209.8	22.4	22.4	11.9	148.9	3.3	0.92	0.2	2.75	15.2	1.32	0.301	10.7	0.63	0.026
KALADAR	14	22.4	25.6	972	122.2	41.9	27.6	128.0	6.1	8.6	3.9	101.5	4.1	0.82	0.2	1.48	16.6	2.05	0.234	15.7	0.58	0.012
SMITH'S FALLS	15	20.6	24.3	1174	135.3	118.7	28.1	139.5	32.6	17.4	7.7	118.0	1.6	0.62	0.1	1.31	7.8	1.78	0.281	3.5	0.25	0.023
DALHOUSIE MILLS	16	32.4	36.7	1660	179.6	124.2	46.8	260.9	17.9	26.6	15.1	196.0	4.4	1.36	0.2	2.50	14.9	3.23	0.386	9.7	0.52	0.043
GOLDEN LAKE	17	18.4	21.7	847	111.5	45.0	23.4	146.1	9.4	12.9	2.2	112.2	2.2	0.70	0.1	1.45	6.2	1.68	0.234	2.2	0.31	0.015
WILBERFORCE	18	29.4	34.1	1258	162.9	55.8	29.8	155.7	8.0	16.2	4.8	137.8	1.7	0.67	0.2	2.00	6.7	2.38	0.319	4.3	0.32	0.016
WHITNEY	19	20.7	25.7	943	111.5	47.2	23.2	124.6	8.0	16.8	2.5	108.0	1.7	0.56	0.2	1.61	5.2	1.17	0.307	4.8	0.35	0.015
DORSET	20	25.6	29.6	1084	132.8	34.1	25.4	144.9	4.8	4.7	2.8	121.2	0.8	0.53	0.2	1.28	5.1	2.02	0.336	3.3	0.26	0.017
MCKELLAR	21	26.8	29.4	1028	145.9	47.2	28.6	174.5	6.3	28.7	5.5	134.0	0.6	0.69	0.2	1.32	8.3	1.68	0.309	3.9	0.32	0.015
MATTAWA	22	22.3	26.5	822	83.1	42.5	23.9	141.4	10.4	12.0	5.6	104.7	1.7	0.69	0.2	1.32	12.7	1.21	0.350	8.3	0.38	0.018
KILLARNEY	23	17.1	26.1	1046	87.2	36.8	22.9	98.0	6.6	15.3	2.7	124.1	1.0	0.41	0.2	1.37	7.4	1.46	0.257	6.0	0.32	0.013
BEAR ISLAND	24	10.8	14.1	427	42.4	20.3	11.3	56.2	7.8	11.2	3.6	40.1	1.5	0.43	0.1	0.95	3.3	0.50	0.241	1.8	0.25	0.018
GOWGANDA	25	9.1	11.2	364	41.1	18.0	14.5	64.5	7.4	14.2	2.4	33.4	2.0	0.31	0.1	0.56	2.1	0.30	0.175	1.3	0.23	0.022
RAMSEY	26	8.2	11.8	347	43.4	19.8	12.4	60.0	5.0	8.5	4.3	37.6	1.8	0.39	0.1	0.68	3.2	0.32	0.231	2.7	0.24	0.013
MOONBEAM	27	11.7	15.3	539	40.8	27.8	10.4	65.0	7.7	9.9	5.0	38.7	1.6	0.38	0.2	0.64	4.7	0.27	0.327	3.1	0.30	0.016
ATTAWAPISKAT	28	0.1	7.9	134	14.1	31.1	89.9	426.1	31.8	71.3	49.1	96.7	35.8	0.61	0.1	0.83	8.5	0.12	0.235	2.7	0.23	0.012
WINISK	29	0.9	4.5	100	10.9	29.7	109.3	29.6	12.1	7.0	72.6	25.8	1.0	0.16	0.1	0.58	2.7	0.26	0.168	1.6	0.15	0.011
NAKINA	30	3.3	9.1	250	37.5	73.6	14.0	102.9	14.3	13.2	7.2	60.5	3.8	0.40	0.2	1.29	4.8	0.51	0.313	5.0	0.32	0.016
DORION	31	4.9	9.9	268	47.0	33.1	11.2	82.5	6.1	9.5	5.9	54.9	1.6	0.77	0.1	0.92	3.8	0.14	0.278	4.2	0.47	0.021
QUETICO CENTRE	32	3.6	11.5	407	73.2	66.0	22.3	174.3	15.2	16.1	8.7	123.5	3.8	1.50	0.2	1.06	12.1	0.83	0.411	8.5	0.40	0.023
LAC LA CROIX	33	1.4	8.7	289	61.2	79.5	22.2	133.4	14.1	15.3	10.0	105.1	4.8	1.45	0.2	1.49	21.1	0.28	0.328	15.6	0.44	0.018
E.L.A.	34	3.4	9.4	347	70.2	66.7	15.5	141.8	12.4	17.0	7.3	89.0	4.8	1.27	0.1	0.63	9.9	0.43	0.291	8.5	0.37	0.015
EAR FALLS	35	1.1	8.3	241	43.0	43.6	19.2	150.6	9.5	35.6	6.9	81.3	10.2	2.82	0.1	2.43	10.4	0.48	0.285	6.8	0.36	0.020
PICKLE LAKE	36	1.3	7.1	217	32.6	49.7	24.3	134.2	8.8	22.8	6.1	83.6	6.4	0.87	0.1	1.14	9.4	0.62	0.262	12.9	0.53	0.034

_____ Less then 2 values

. Missing

TABLE 10:
SEASONAL DEPOSITION (MG/M2)**

SEASON = AUTUMN 82

	ID	HF	HT	SO4	N_NO3	CA	CL	N_TKN	MG	K	NA	N_NH4	P_PO4	MN	NI	ZN	FE	PB	V	AL	CU	CD
COLCHESTER	1	17.0	22.7	946	115.3	101.9	61.6	128.0	29.7	8.5	24.7	100.3	2.6	0.62	0.1	1.84	6.6	2.67	0.278	5.7	0.25	0.014
MERLIN	2	11.1	18.1	762	96.3	113.1	41.7	118.2	25.2	5.1	21.1	80.9	5.1	0.85	0.1	1.59	8.0	1.99	0.267	6.3	0.33	0.013
PORT STANLEY	3	21.9	26.0	847	125.2	74.6	44.8	104.1	13.3	11.7	22.5	78.7	4.7	0.48	0.2	1.09	5.3	1.88	0.308	5.0	0.28	0.037
WILKESPORT	4	15.7	21.1	818	104.8	85.5	48.0	110.6	12.6	8.8	26.2	92.4	2.2	0.49	0.1	1.42	7.2	1.01	0.395	5.9	0.32	0.012
ALVINSTON	5	15.3	20.3	773	117.1	77.5	51.6	123.9	13.1	22.2	27.5	92.0	4.8	0.59	0.1	2.74	12.7	1.53	0.266	8.2	0.52	0.027
HURON PARK	6	15.2	21.7	957	133.5	127.4	42.3	156.3	36.2	14.7	25.7	128.6	3.3	0.70	0.2	2.77	11.1	2.68	0.282	8.3	0.20	0.014
WATERLOO	7	20.4	27.8	1360	192.7	119.4	47.2	296.1	27.3	27.8	20.5	248.3	11.0	0.99	0.3	2.70	11.2	3.63	0.303	7.4	0.41	0.061
PALMERSTON	8	13.2	17.0	815	113.6	69.6	35.4	207.2	17.9	18.2	16.8	177.9	7.0	0.38	0.1	1.21	5.7	1.40	0.284	4.9	0.20	0.014
SHALLOW LAKE	9	12.6	21.2	703	126.5	52.6	52.2	161.5	10.8	20.4	22.4	110.8	5.6	0.39	0.1	1.28	4.6	1.02	0.260	3.3	0.21	0.013
MILTON	10	12.5	19.4	1097	163.9	166.2	65.5	207.5	69.7	30.6	11.3	158.9	11.8	1.26	0.2	2.89	9.2	3.64	0.268	6.5	0.26	0.046
UXBRIDGE	11	17.6	24.0	726	110.9	56.9	26.5	121.6	9.6	11.7	17.5	87.2	4.9	0.29	0.1	1.03	4.9	1.78	0.292	3.2	0.36	0.072
COLDWATER	12	11.9	16.5	560	85.4	34.9	32.3	91.3	5.2	5.6	9.4	73.2	2.4	0.25	0.1	0.68	3.1	1.38	0.242	2.3	0.17	0.012
CAMPBELLFORD	13	22.4	24.8	722	116.0	47.6	31.5	89.9	5.0	4.1	11.2	77.2	1.6	0.24	0.1	0.91	2.9	1.70	0.242	2.3	.	0.024
KALADAR	14	15.2	17.7	525	88.5	39.3	15.4	62.1	6.2	3.9	7.0	53.3	0.5	0.26	0.1	0.72	2.9	1.23	0.169	2.5	0.16	0.013
SMITH'S FALLS	15	8.9	11.4	502	78.9	60.7	22.0	64.8	.	4.1	8.2	52.9	1.1	0.48	0.1	0.78	3.2	1.32	0.138	2.3	0.14	0.010
DALHOUSIE MILLS	16	13.0	16.4	572	91.2	67.8	21.0	87.8	6.6	6.7	8.0	67.8	2.8	0.59	0.1	1.61	6.4	2.02	0.191	3.0	0.30	0.013
GOLDEN LAKE	17	12.0	14.8	408	70.6	26.2	16.7	60.2	5.1	3.3	6.1	44.6	1.4	0.21	0.1	0.88	3.4	1.16	0.182	1.9	0.16	0.020
WILBERFORCE	18	19.2	28.2	891	156.7	47.6	49.0	112.2	7.9	6.7	15.4	87.1	1.3	0.25	0.2	1.05	3.9	2.08	0.381	3.7	0.25	0.019
WHITNEY	19	14.8	21.1	606	99.5	32.4	28.2	81.6	5.0	4.3	10.2	58.3	1.7	0.25	0.1	0.93	4.0	1.62	0.426	2.0	0.23	0.014
DORSET	20	20.1	27.3	821	138.6	49.3	41.3	100.1	7.2	2.5	14.9	89.9	1.1	0.38	0.2	0.96	4.1	2.01	0.328	3.2	0.23	0.016
MCKELLAR	21	19.6	28.4	856	140.0	46.2	48.4	120.2	7.7	15.9	26.5	92.9	1.5	0.36	0.2	1.68	7.9	0.91	0.319	4.1	0.29	0.020
MATTAWA	22	14.5	18.4	610	113.8	37.7	25.0	87.3	6.5	7.6	14.3	74.9	1.8	0.80	0.3	1.09	7.4	1.66	0.242	4.5	0.50	0.012
KILLARNEY	23	22.7	25.5	874	164.6	69.4	34.6	71.4	10.1	9.4	15.3	107.5	1.3	0.70	0.1	1.46	8.5	2.00	0.239	6.5	0.23	0.014
BEAR ISLAND	24	13.6	17.5	550	80.4	39.8	18.4	86.6	8.6	3.0	8.2	40.9	1.1	0.74	0.2	1.32	4.2	0.92	0.195	4.6	0.18	0.017
GOWGANDA	25	12.5	17.2	477	52.9	15.9	17.6	70.6	3.5	7.1	12.4	37.8	0.4	0.18	0.1	1.50	4.7	1.41	0.176	3.3	0.26	0.018
RAMSEY	26	9.7	13.4	371	54.5	18.5	13.9	50.7	3.0	7.4	9.4	35.2	0.7	0.21	0.1	0.75	5.3	0.39	0.207	7.0	0.19	0.010
MOONBEAM	27	5.8	12.5	394	48.1	40.8	18.2	90.7	5.5	11.1	14.5	64.6	1.2	0.34	0.1	3.31	2.3	1.52	0.262	2.9	0.68	0.096
ATTAWAPISKAT	28	2.4	9.6	255	62.4	51.0	62.4	123.4	14.2	75.3	38.3	53.2	4.6	1.55	0.1	4.85	19.9	0.69	0.283	13.9	0.97	0.155
WINISK	29	0.3	2.4	140	14.7	56.1	94.2	14.6	14.4	7.4	60.5	7.2	0.5	0.15	0.0	1.05	4.9	0.11	0.096	2.3	0.18	0.017
NAKINA	30	1.5	6.8	244	27.5	34.3	12.0	80.0	4.5	8.5	9.4	57.0	3.4	0.36	0.1	0.86	6.4	0.36	0.144	4.8	0.14	0.013
DORION	31	7.8	14.4	464	53.8	50.6	7.6	100.0	6.5	7.9	11.0	69.3	1.2	0.51	0.1	0.51	7.2	1.32	0.227	7.5	0.21	0.011
QUETICO CENTRE	32	4.3	9.9	270	41.9	32.9	9.8	83.1	3.5	8.8	6.9	56.3	1.6	0.27	0.1	0.75	4.5	1.25	0.212	4.7	0.21	0.014
LAC LA CROIX	33	5.4	10.6	325	56.4	49.0	25.7	132.2	6.3	24.6	16.7	49.1	3.5	0.83	0.1	1.84	8.4	1.37	0.253	3.2	0.30	0.068
E.L.A.	34	2.2	7.5	228	30.1	46.1	11.3	65.6	4.9	8.8	10.2	47.0	1.0	0.73	0.1	0.65	13.0	0.86	0.186	15.2	0.15	0.010
EAR FALLS	35	1.5	7.6	260	33.4	48.8	19.6	87.8	6.2	17.7	17.9	54.1	3.2	0.53	0.3	0.69	8.3	0.82	0.176	12.3	0.65	0.009
PICKLE LAKE	36	1.9	4.7	133	16.7	12.2	10.7	58.4	2.1	3.5	5.1	28.2	1.9	0.15	0.1	0.98	4.8	0.44	0.102	3.0	0.19	0.011

——— **Less then 2 values**

. **Missing**

Figure 1: APIOS CUMULATIVE WET DEPOSITION NETWORK SITE LOCATION MAP (1982)

1 - COLCHESTER
2 - MERLIN
3 - PORT STANLEY
4 - WILKESPORT
5 - ALVINSTON
6 - HURON PARK
7 - WATERLOO
8 - PALMERSTON
9 - SHALLOW LAKE
10 - MILTON
11 - UXBRIDGE
12 - COLDWATER
13 - CAMPBELLFORD
14 - KALADAR
15 - SMITH'S FALLS
16 - DALHOUSIE MILLS
17 - GOLDEN LAKE
18 - WILBERFORCE
19 - WHITNEY
20 - DORSET
21 - MCKELLAR
22 - MATTAWA
23 - KILLARNEY
24 - BEAR ISLAND
25 - GOWGANDA
26 - RAMSEY
27 - MOONBEAM
28 - ATTAWAPISKAT
29 - WINISK
30 - NAKINA
31 - DORION
32 - QUETICO CENTRE
33 - LAC LA CROIX
34 - EXP. LAKES AREA
35 - EAR FALLS
36 - PICKLE LAKE

CLIMAT

1	ATIKOKAN	26	EARLTON	51	OTTAWA	76	TIMMINS
2	AVONMORE	27	FRENCH R CM	52	OWEN SOUND	77	TOBERMORY
3	BALLANTRAE	28	GEORGETOWN W	53	PARRY SOUND	78	TRENTON
4	BANCROFT	29	GERALDTON	54	PELEE ISLAND	79	VERMILLION
5	BARWICK	30	GORE BAY	55	PETERBOROUGH	80	WALLACE BURG
6	BEARDMORE	31	HALIBURTON	56	PICKLE	81	WATERLOO
7	BIG TROUT LK	32	HAMILTON M	57	PICTON	82	WIARTON
8	CAMPBELLFORD	33	HORNEPAYNE	58	P DALHOUSI	83	WINDSOR
9	CARAMET	34	HUNTSVILL MOE	59	P HOPE	84	AMOS
10	CHALK RIVER AEC	35	IGNACE TCPL	60	P STANLEY	85	BELLETERRE
11	CHAPLEAU A	36	KAPUSKASING	61	RAMSAY	86	CHIBOUGAMAU
12	CHATHAM WATER W	37	KENORA	62	RED LAKE	87	GILLAM
13	COCHRANE	38	KINGSTON	63	RENFREW	88	MANIWAKI
14	COLDWATER WARMI	39	KINGSVILL MOE	64	ST. CHARLES	89	MATAGAMI
15	COMBERMERE	40	KIRKLAND L	65	SALTFORD	90	NOTRE DAME D P
16	CORNWELL CH	41	LONDON	66	SARNIA	91	POSTE D L BAL
17	CRYSTAL FALLS	42	MADAWASKA	67	SCOTLAND		
18	DALKEITH PHM	43	MALLORYTOWN L	68	SIOUX LOOKOUT		
19	DASHWOOD	44	MINE CENTRE	69	SLEEMAN		
20	DORION TCPL	45	MORRISBURG	70	SMITH FALLS		
21	DORSET MOE	46	MT. FOREST	71	SOUTH BAY M		
22	DRYDEN	47	NEW GLASGOW	72	SOUTH RIVER		
23	DUNCHURCH	48	NORTH BAY	73	SUDBURY		
24	DUNNVILLE PS	49	OAKVILLE S E	74	TAVISTOCK		
25	EAR FALLS	50	ORANGEVILLE MOE	75	THUNDER BAY		

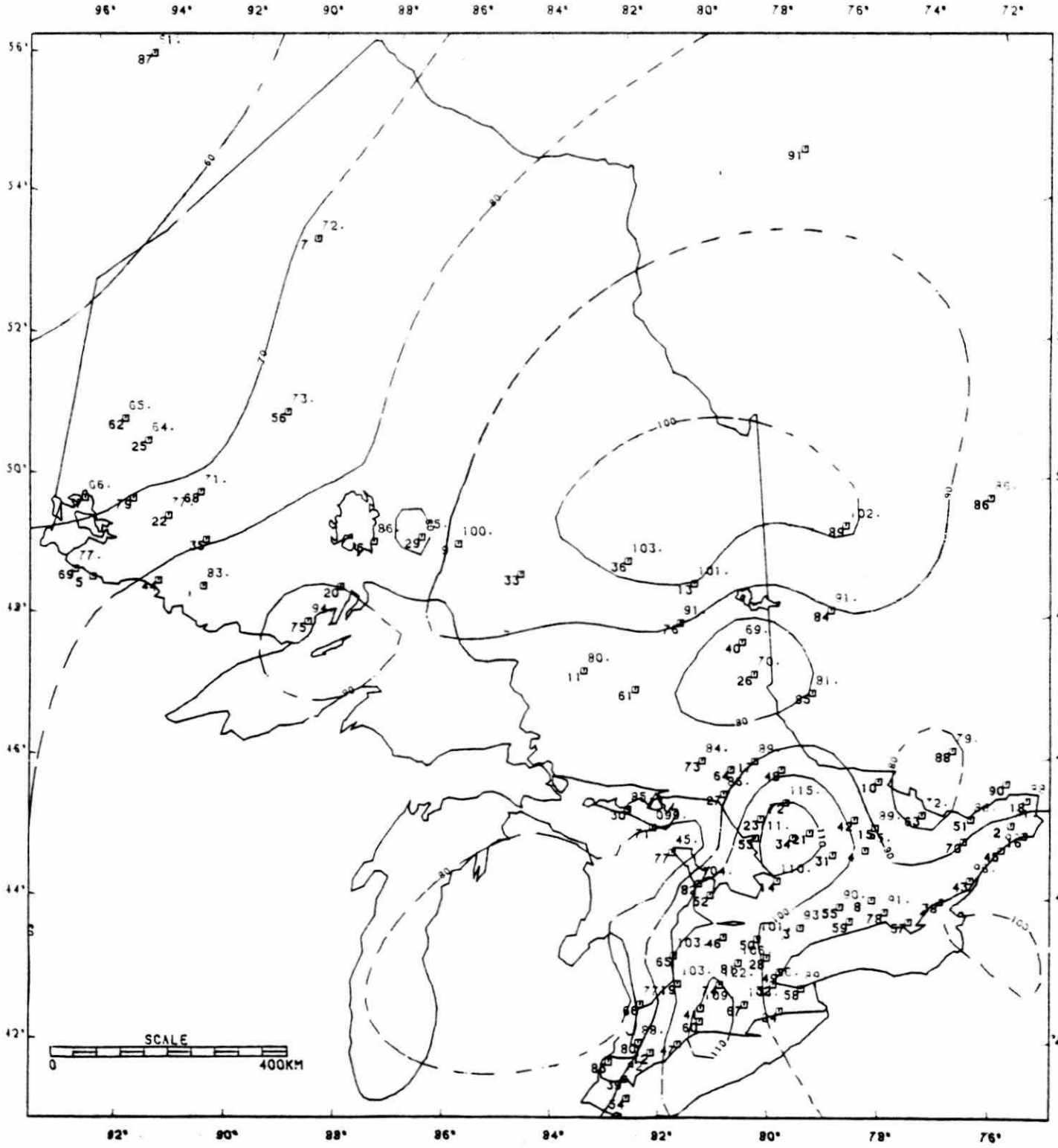

FIGURE 2. ANNUAL CLIMAT GAGE DEPTH (CM) OF 1982

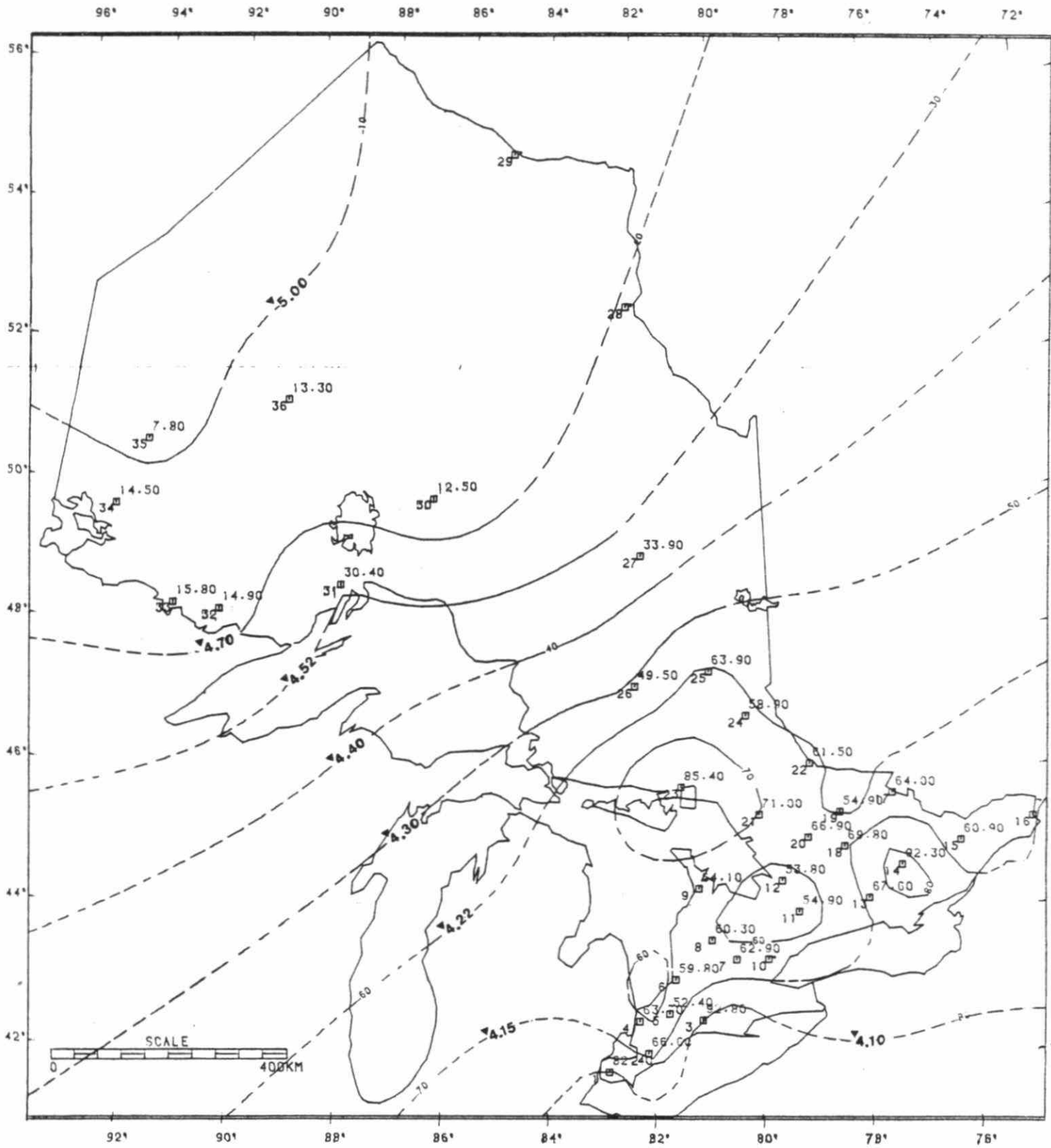

FIGURE 3a AVERAGE ANNUAL CONCENTRATION (UG/L) OF H_f - 1982
▼PH VALUE

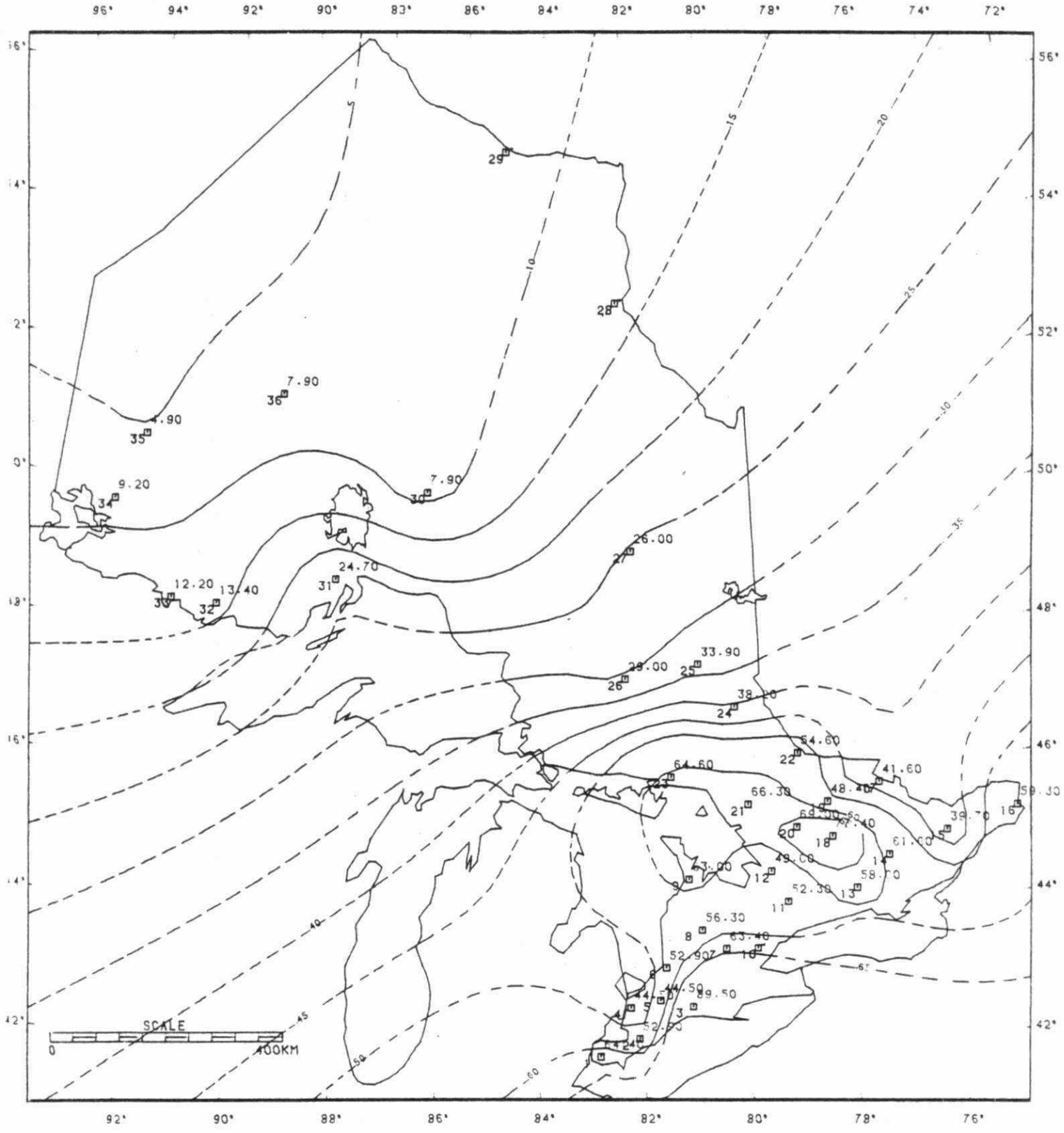

FIGURE 3b ANNUAL DEPOSITION (MG/M**2) OF H_f - 1982

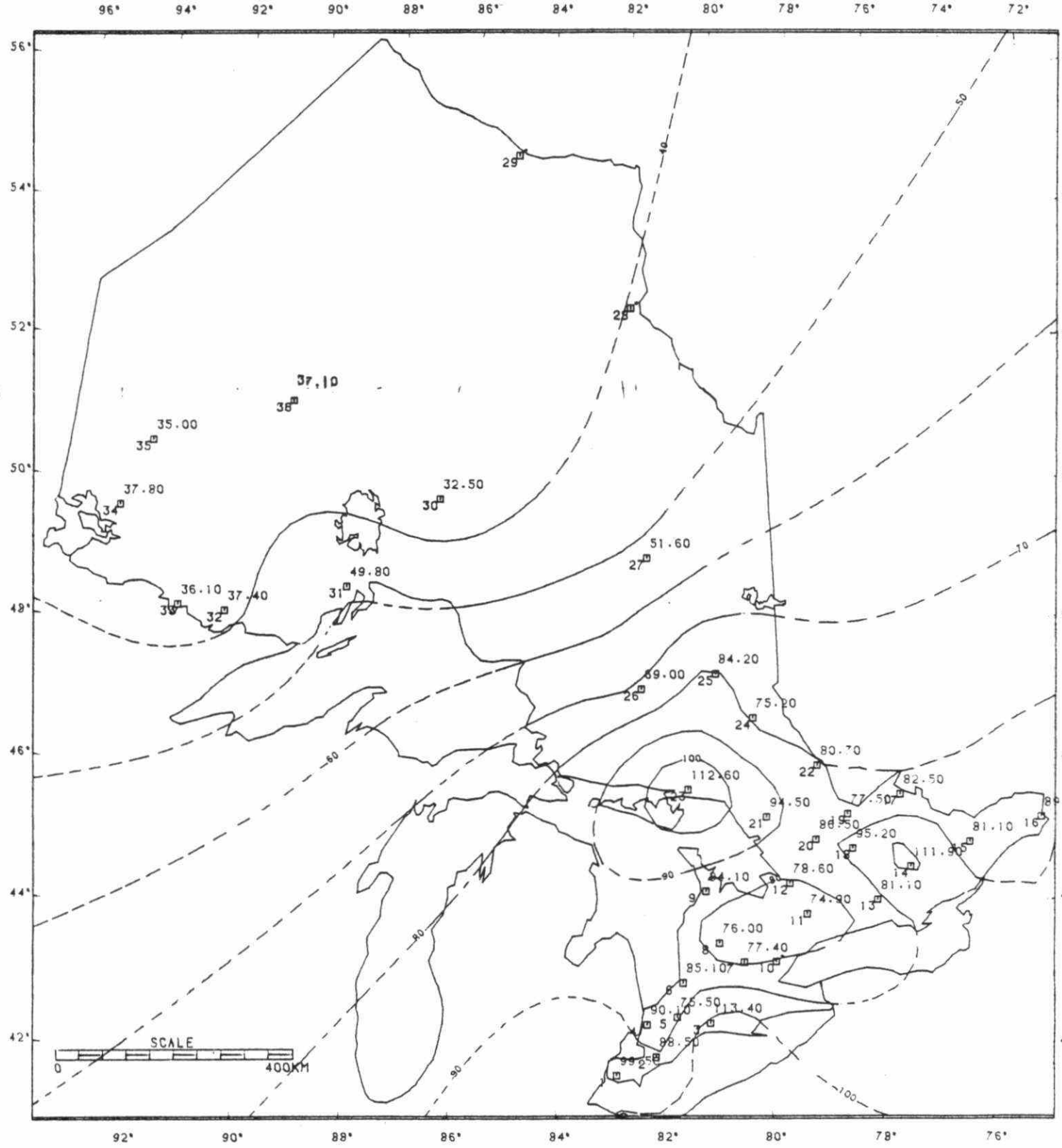

FIGURE 4a AVERAGE ANNUAL CONCENTRATION (UG/L) OF H_t - 1982

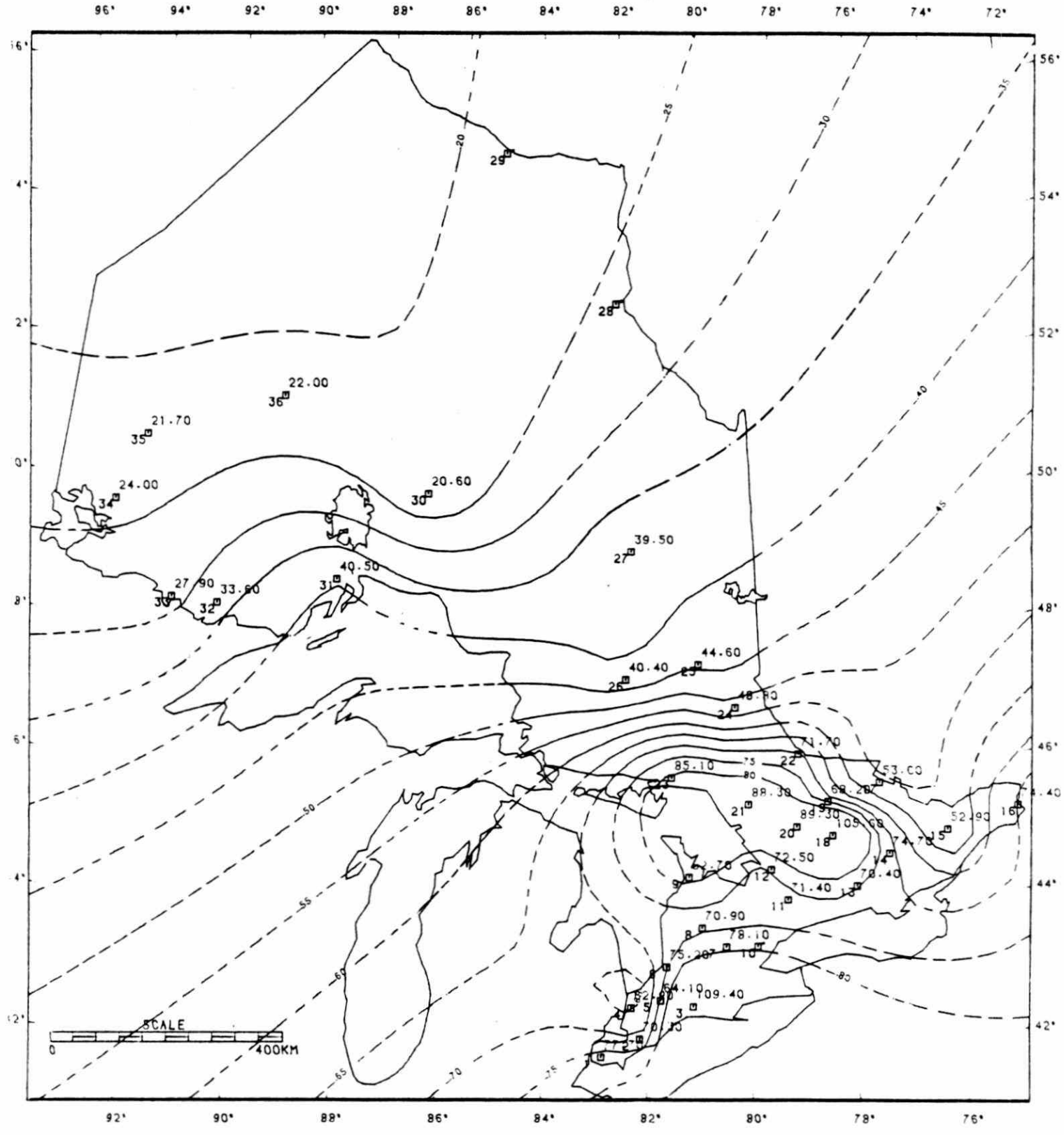

FIGURE 4b ANNUAL DEPOSITION (MG/M**2) OF H_t - 1982

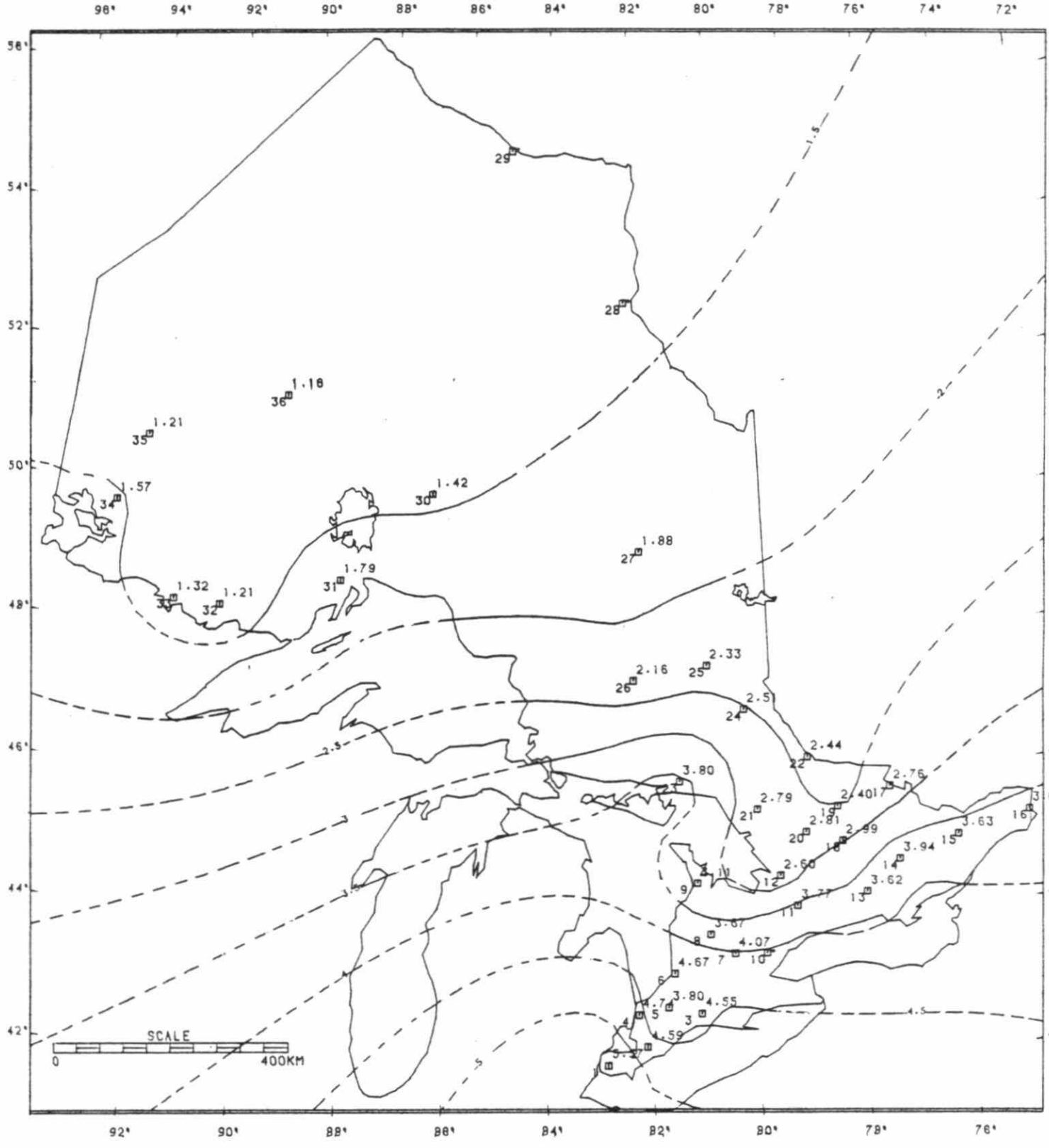

FIGURE 5a AVERAGE ANNUAL CONCENTRATION (MG/L) OF SO4 -1982

NOTE: MULTIPLY VALUES BY TEN TO ARRIVE AT
kg/ha—yr UNIT.

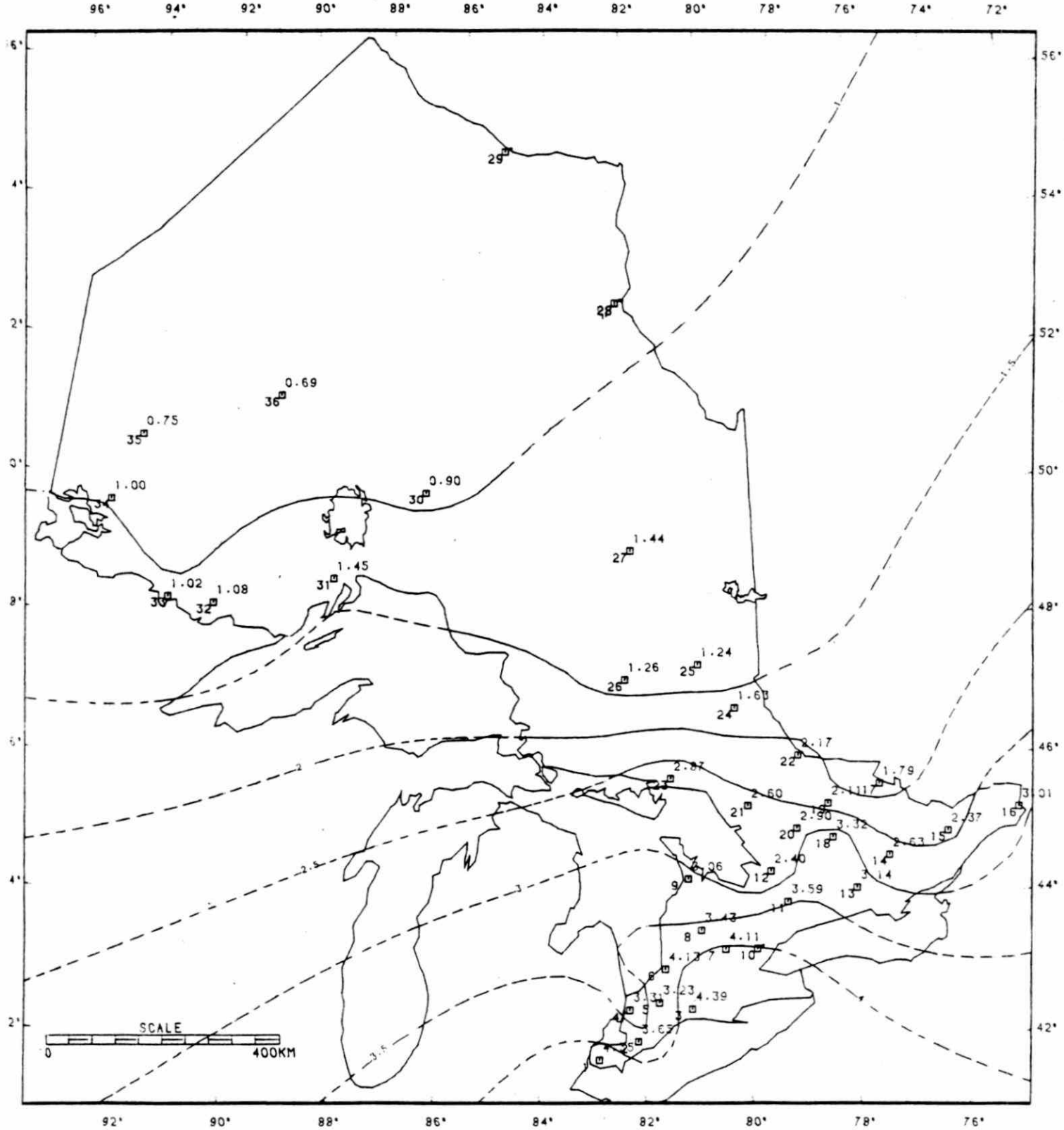

FIGURE 5b. ANNUAL DEPOSITION (G/M**2) OF SO4 -1982

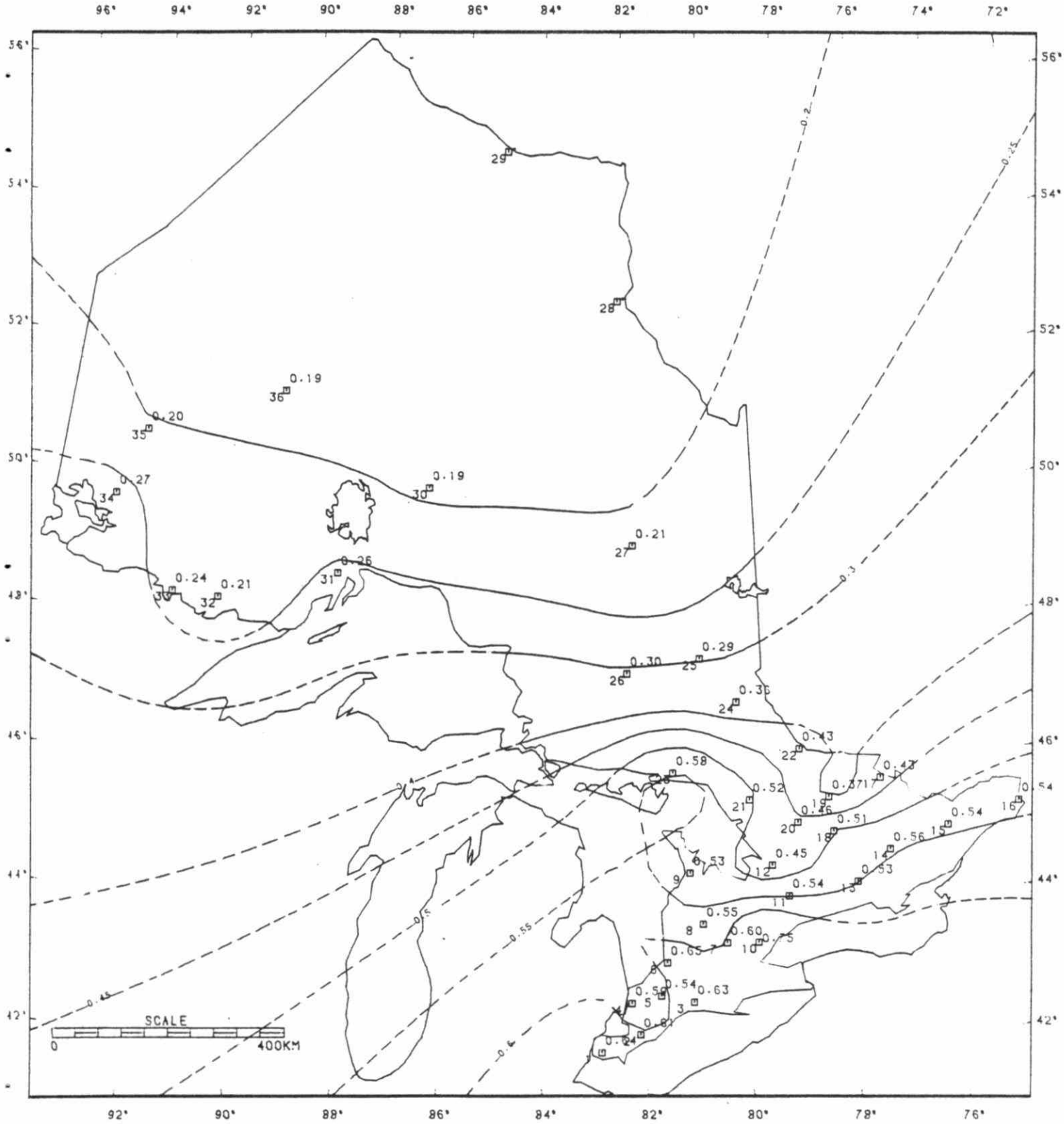

FIGURE 6a. AVERAGE ANNUAL CONCENTRATION (MG/L) OF N-NO3 -1982

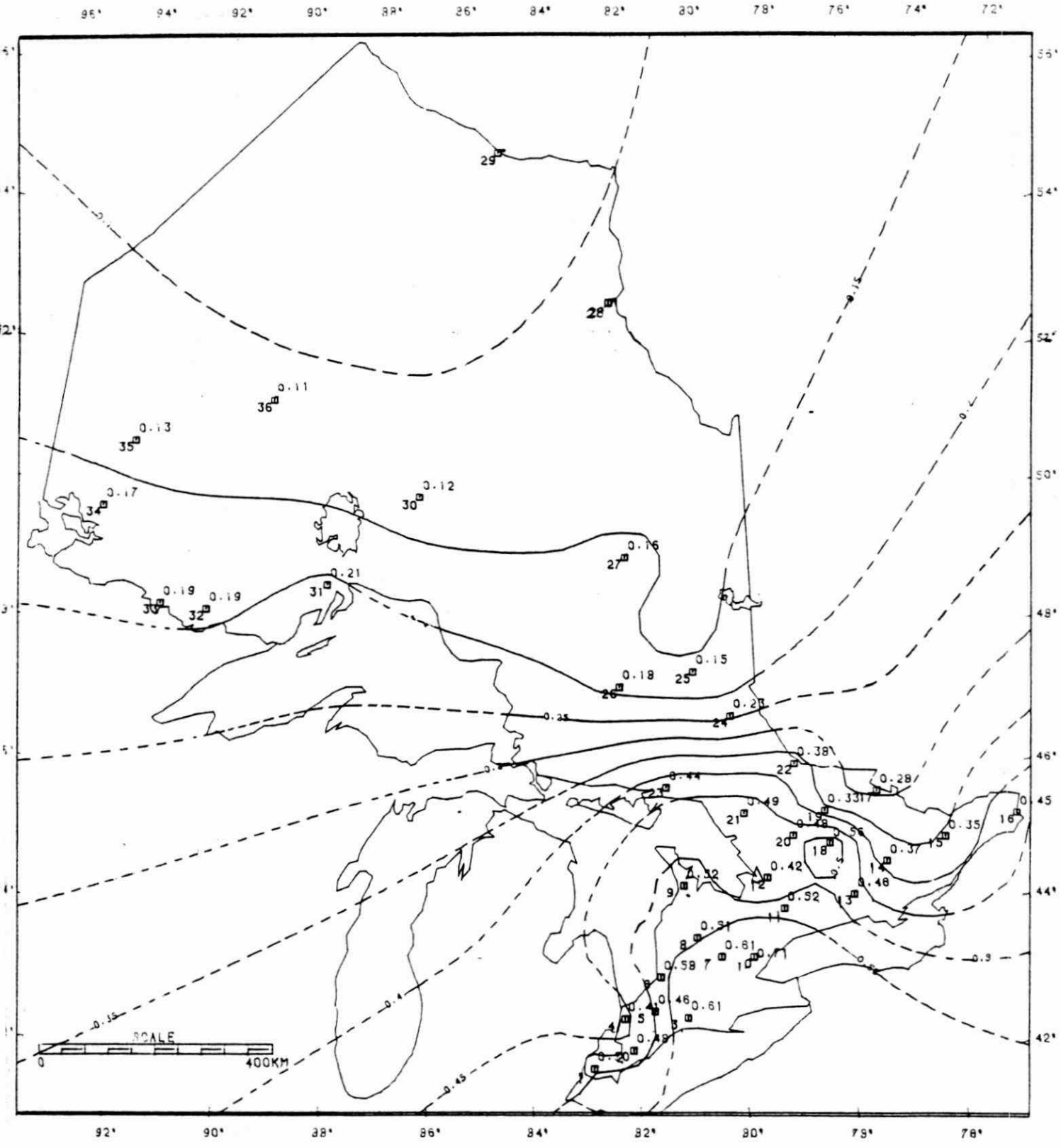

FIGURE 6b. ANNUAL DEPOSITION (G/M**2) OF N-NO3 -1982

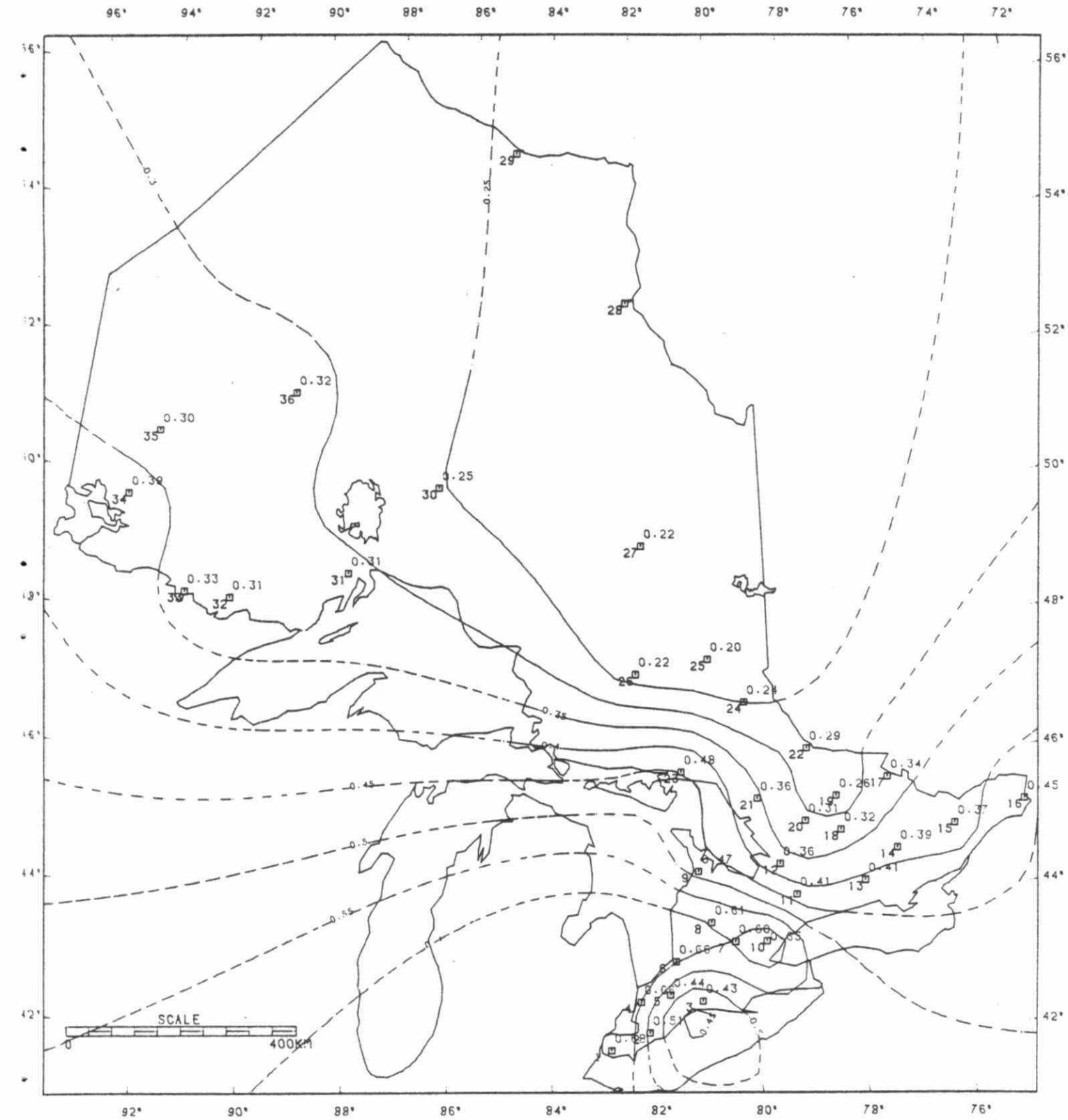

FIGURE 7a. AVERAGE ANNUAL CONCENTRATION (MG/L) OF N-NH4 - 1982

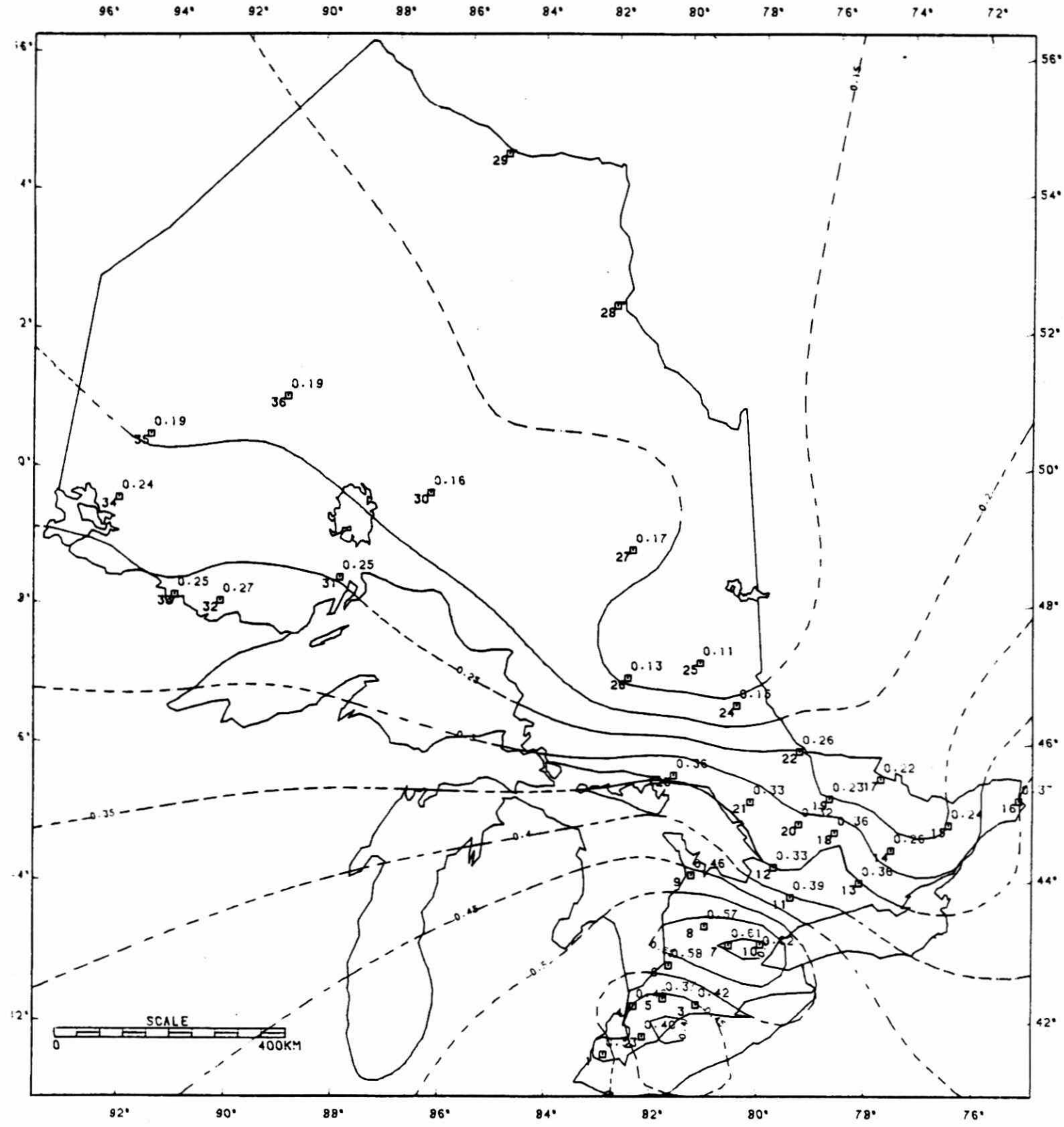

FIGURE 7b. ANNUAL DEPOSITION (G/M**2) OF N-NH4 - 1982

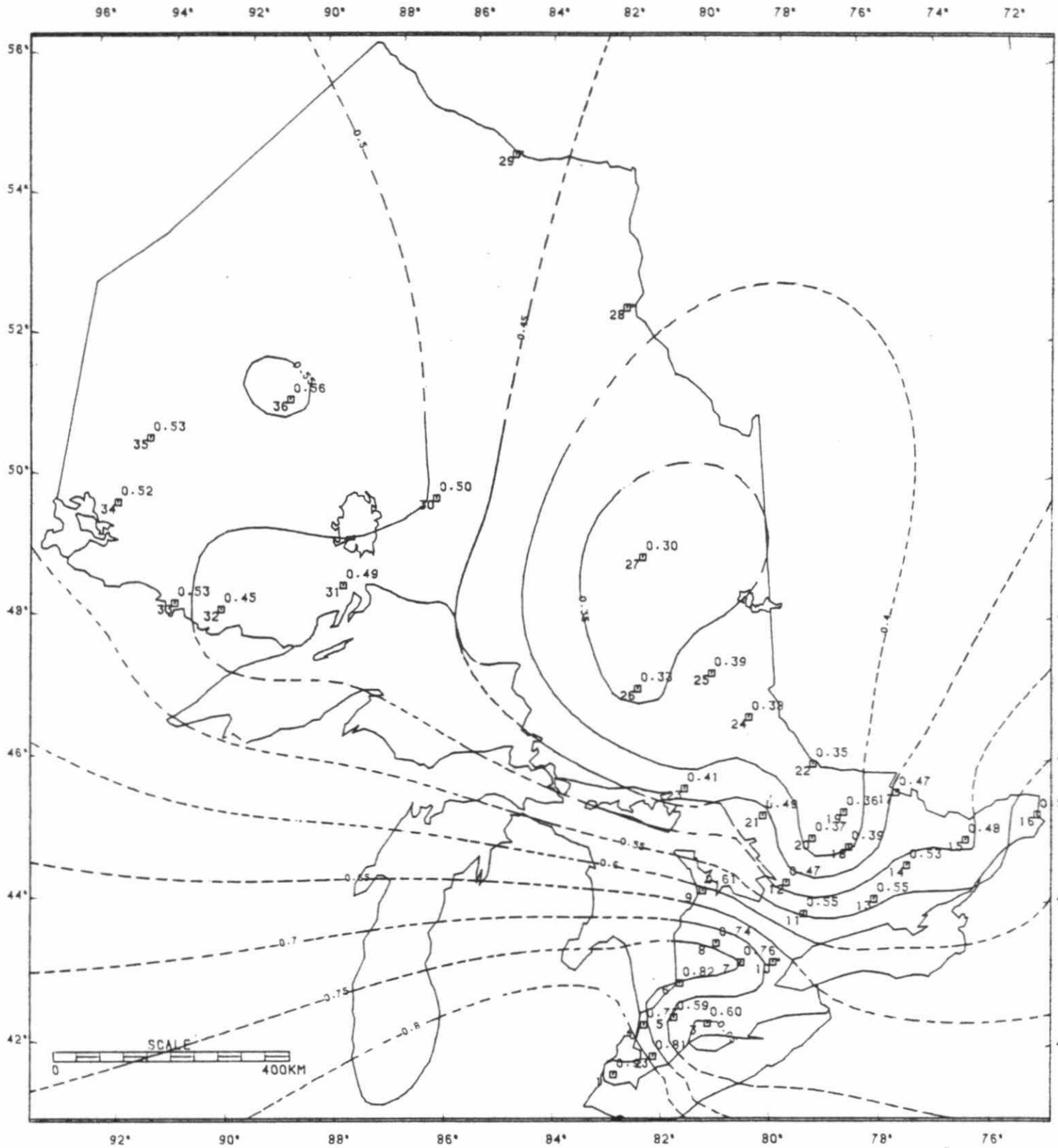

FIGURE 8a AVERAGE ANNUAL CONCENTRATION (MG/L) OF N-TKN -1982

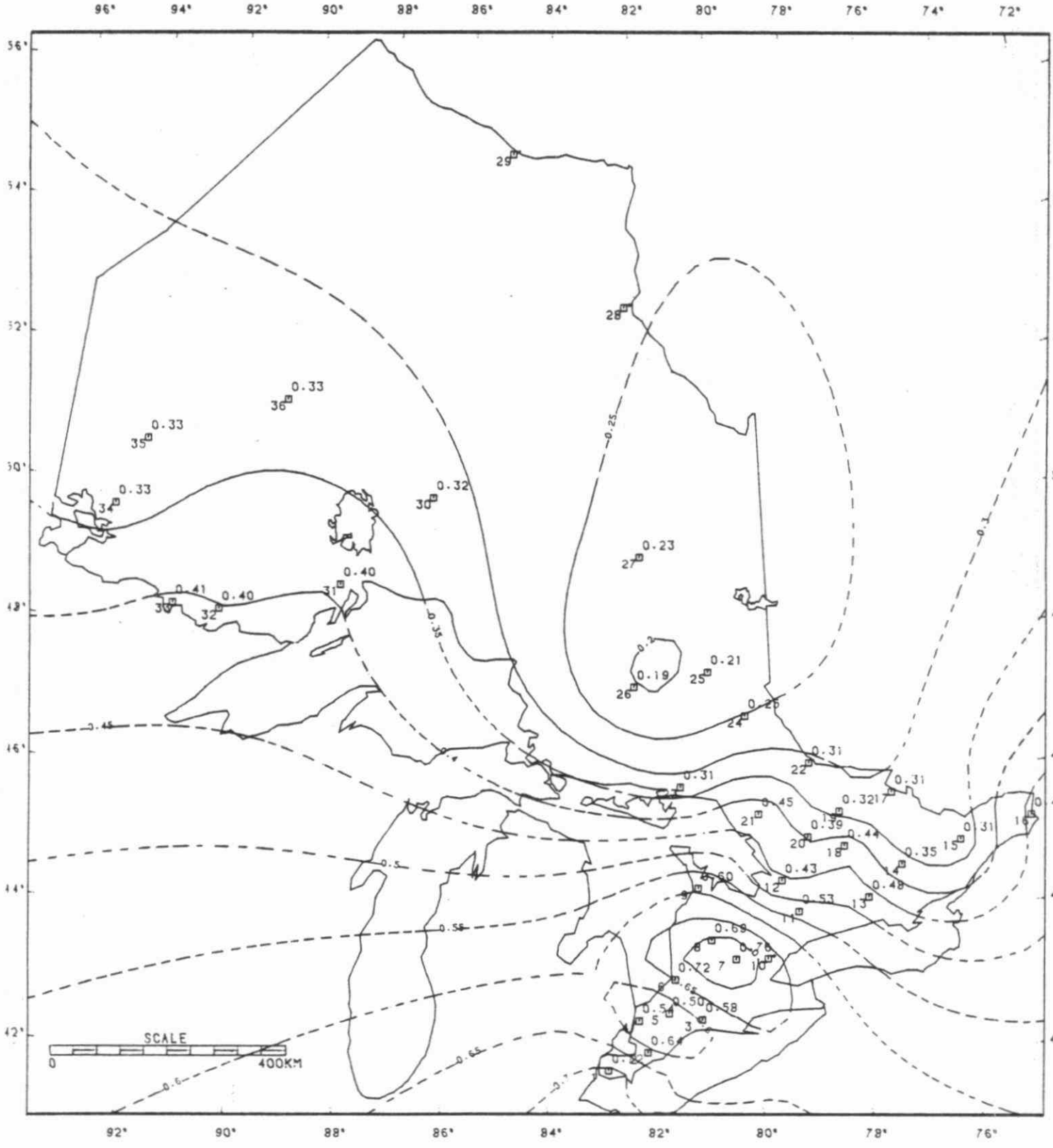

FIGURE 8b ANNUAL DEPOSITION (G/M**2) OF N-TKN -1982

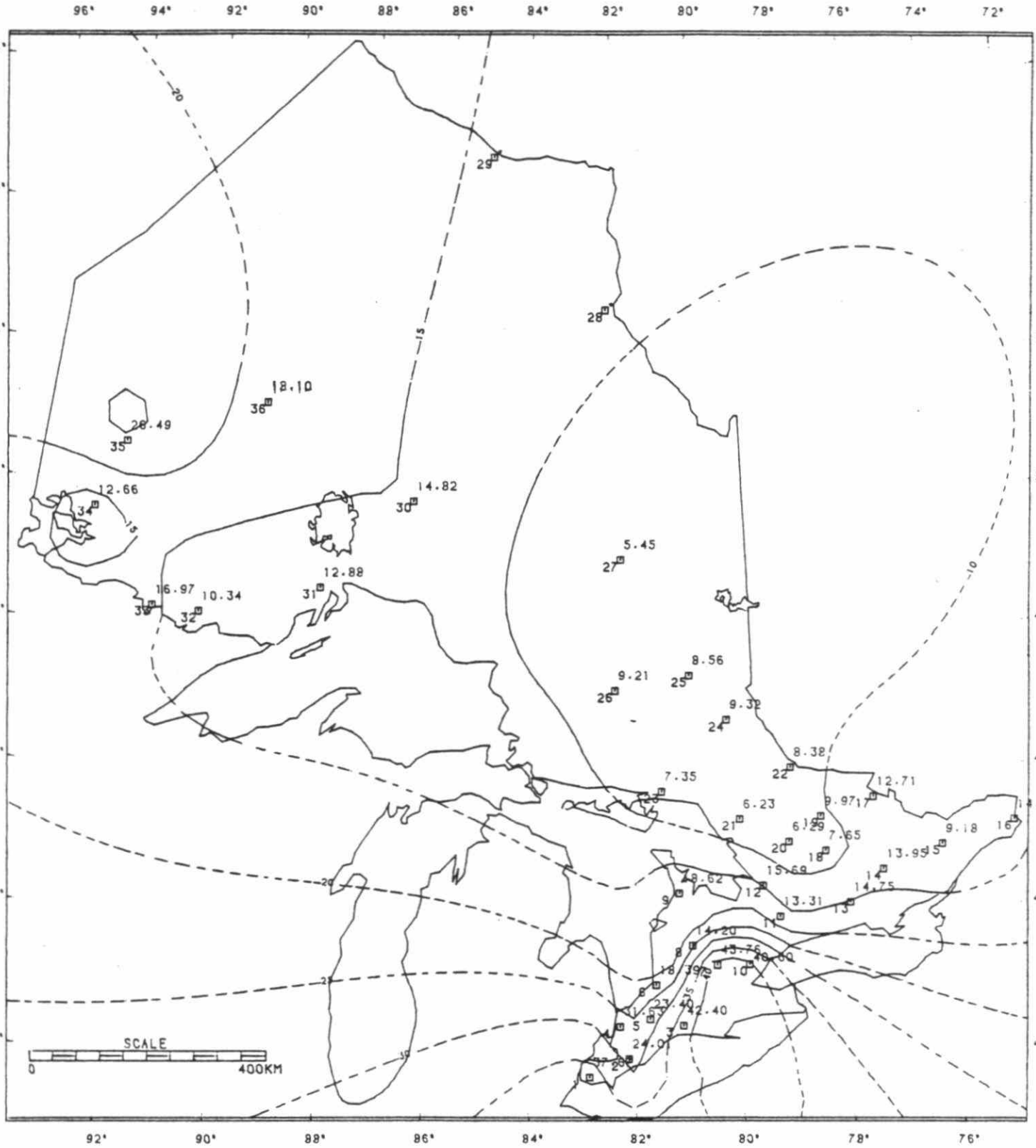

FIGURE 9a. AVERAGE ANNUAL CONCENTRATION (UG/L) OF P-PO4 -1982

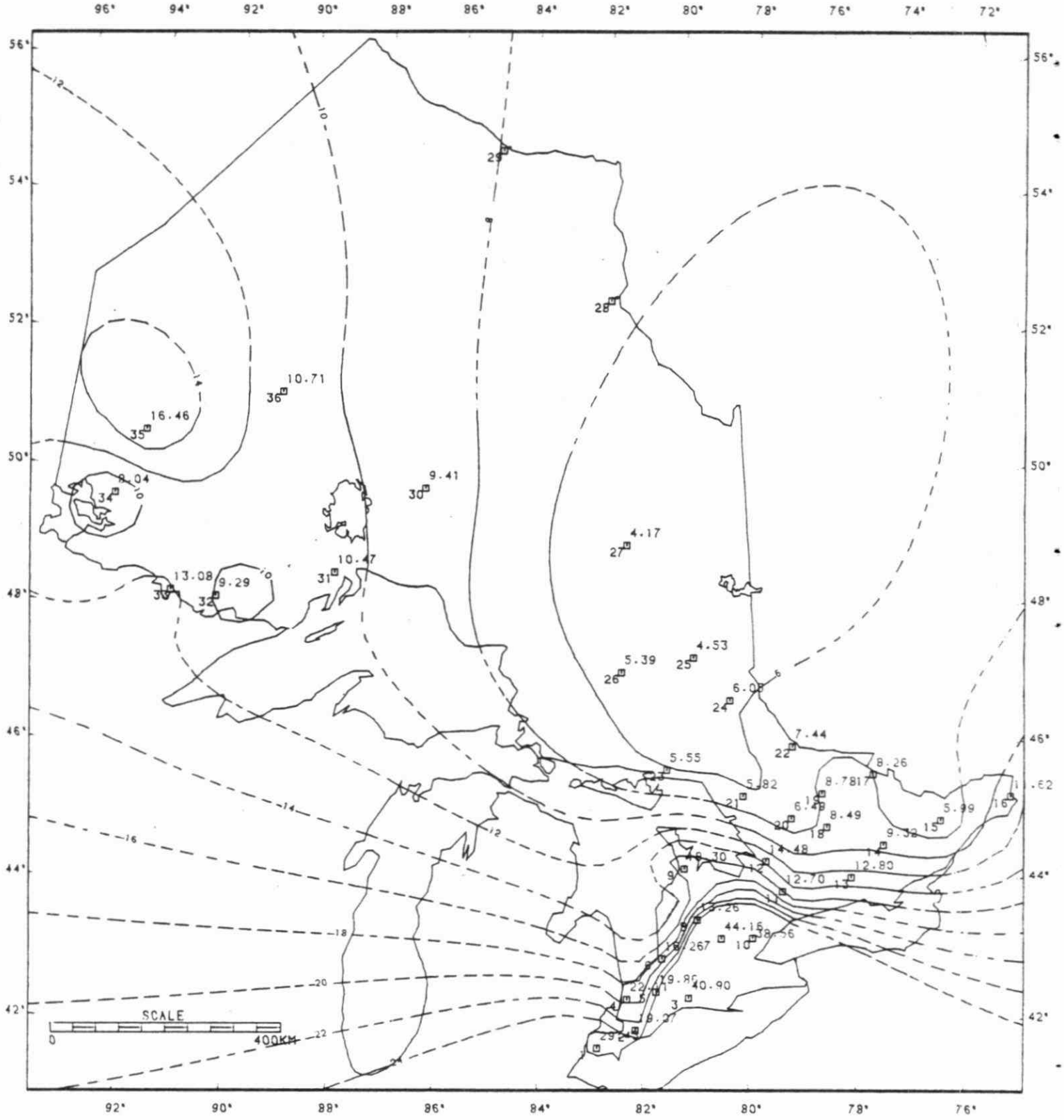

FIGURE 9b ANNUAL DEPOSITION (MG/M**2) OF P-PO4 -1982

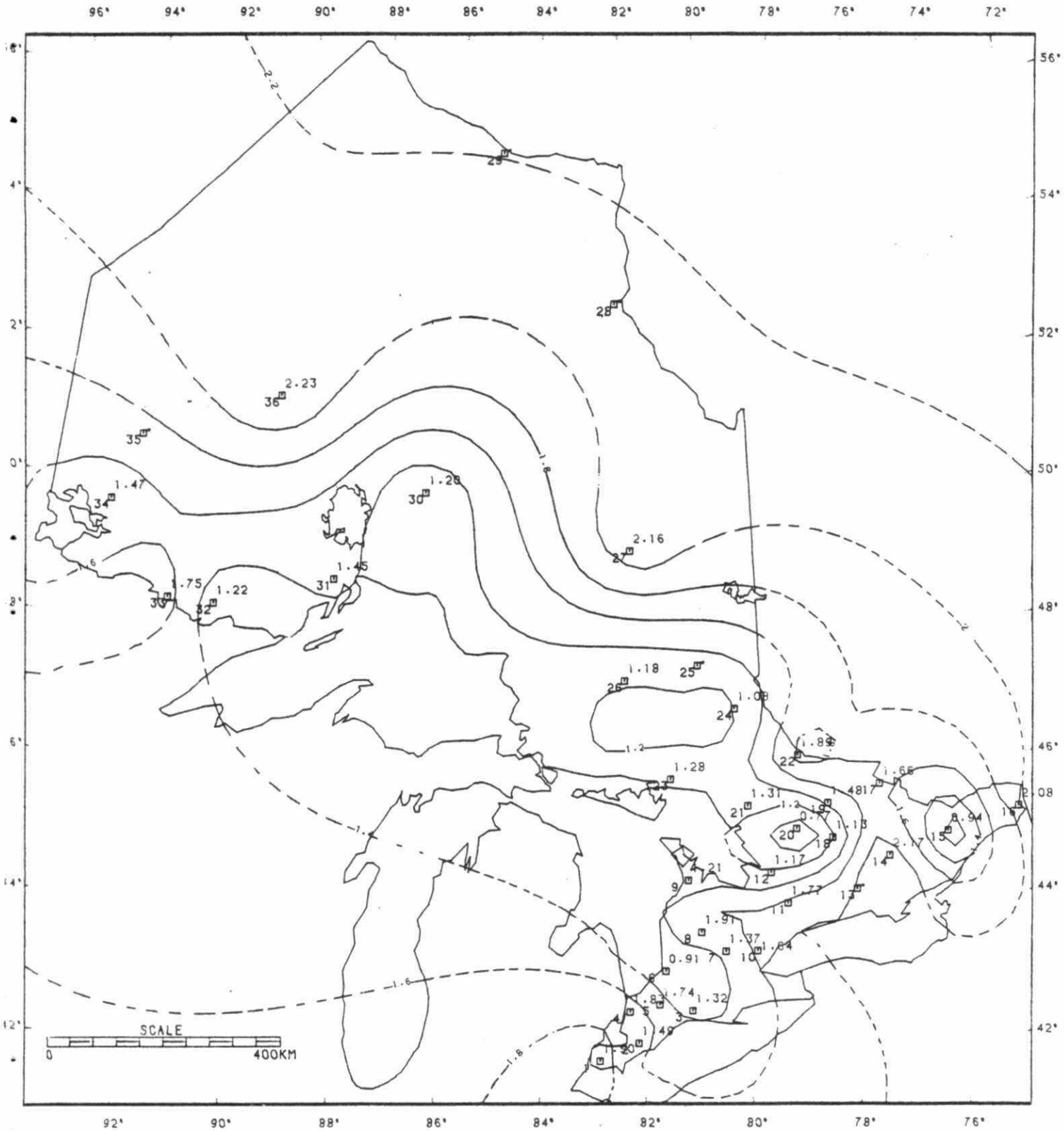

FIGURE 10a. AVERAGE ANNUAL CONCENTRATION (UG/L) OF CU -1982

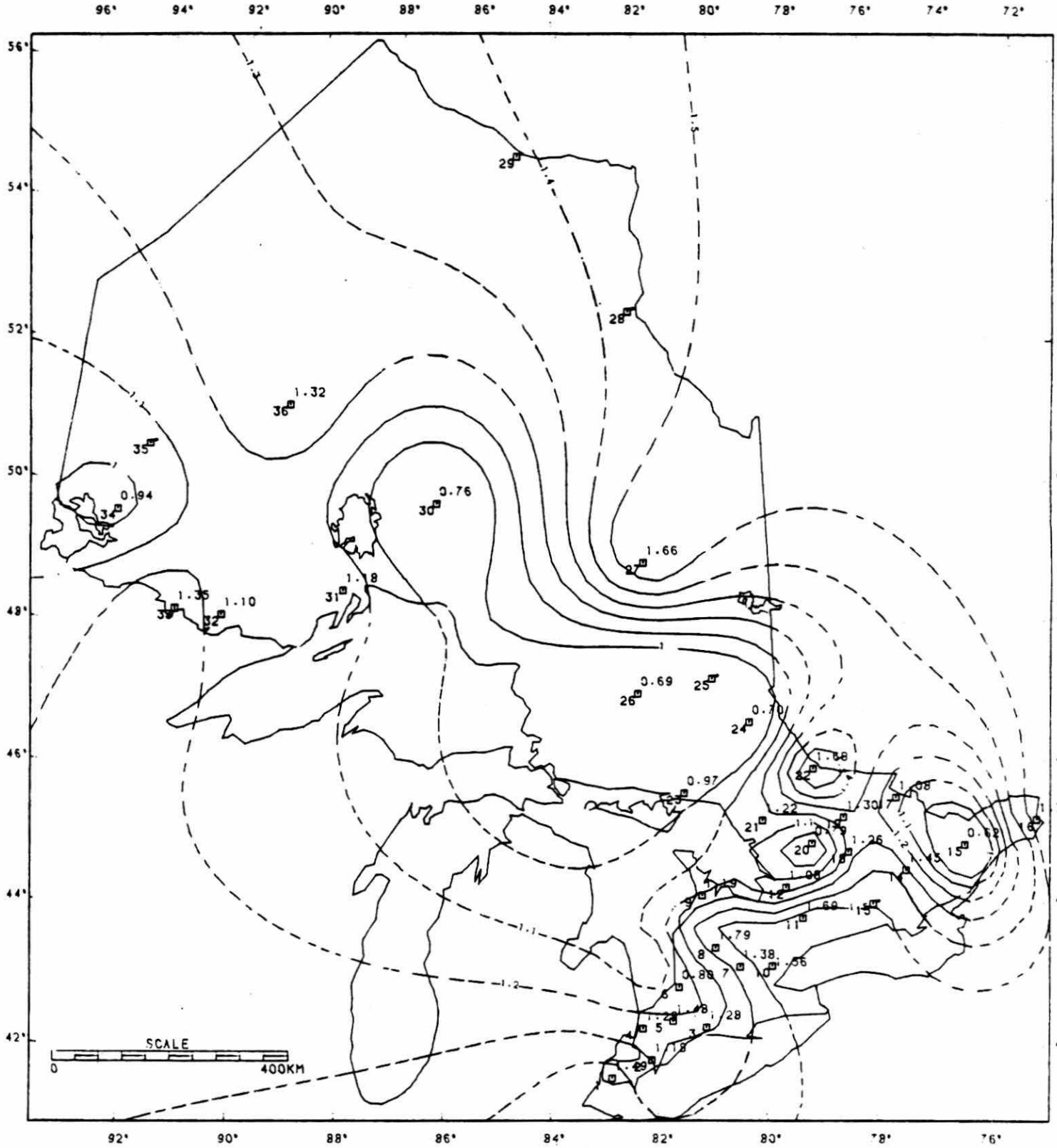

FIGURE 10b. ANNUAL DEPOSITION (MG/M**2) OF CU -1982

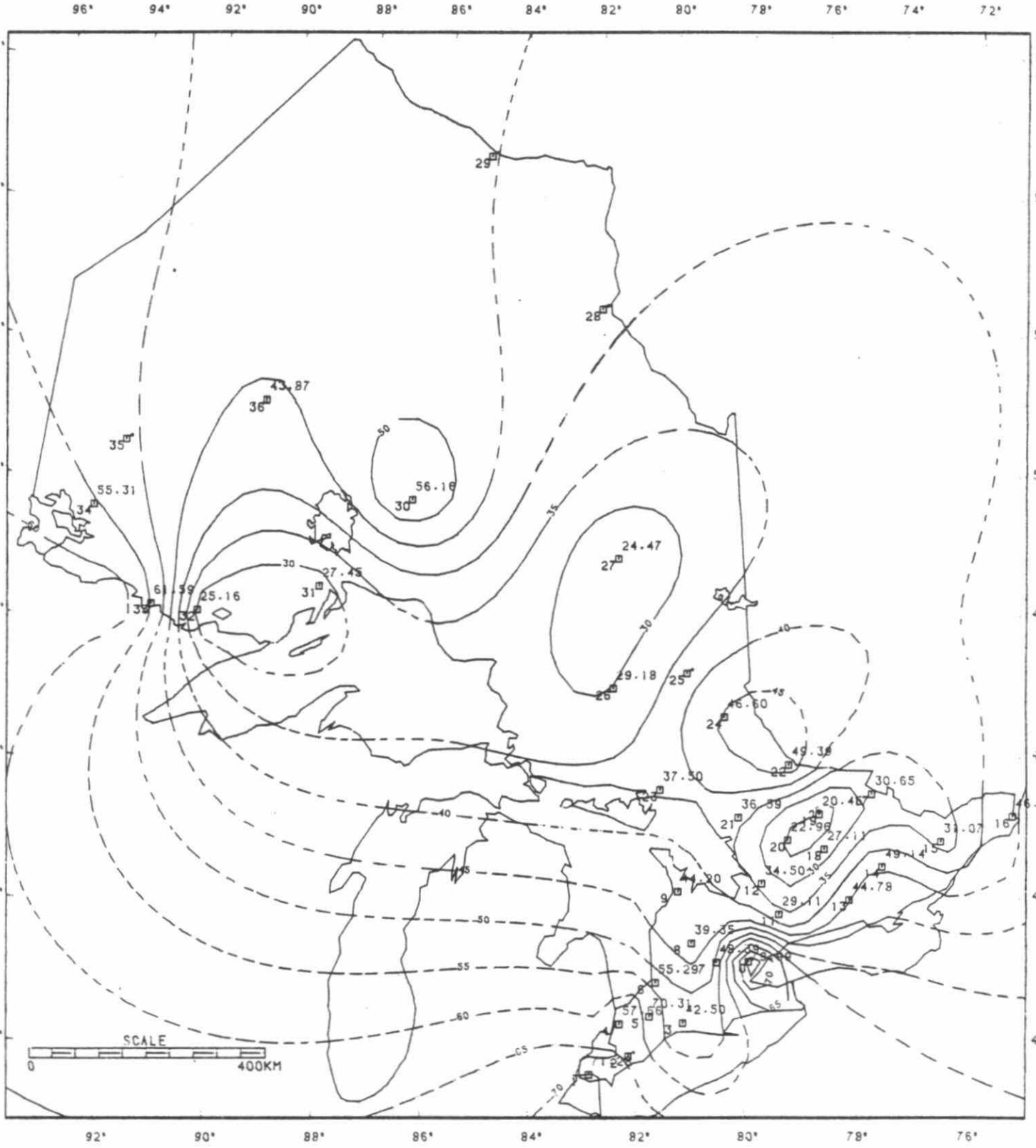

FIGURE 11a. AVERAGE ANNUAL CONCENTRATION (UG/L) OF FE -1982

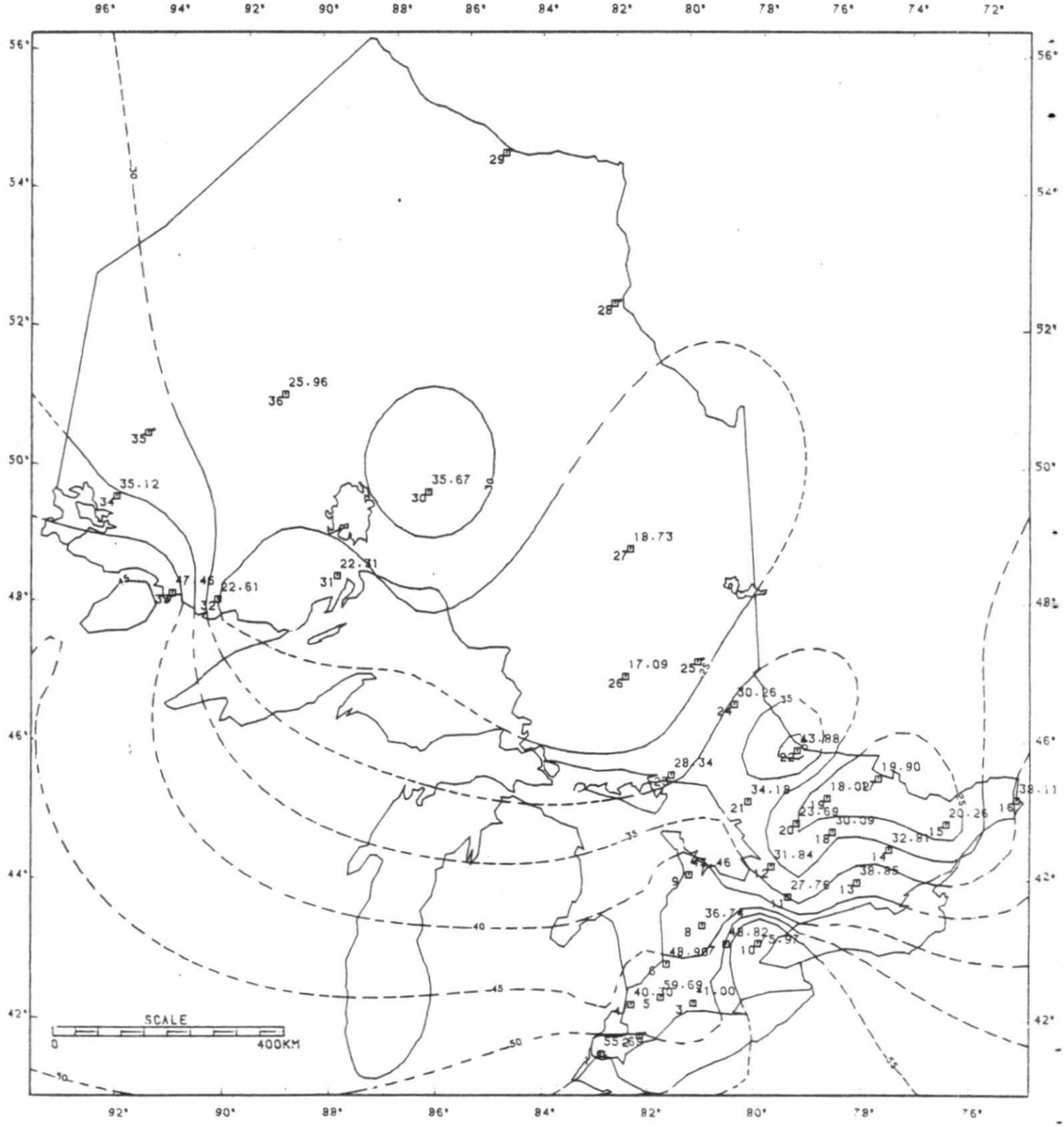

FIGURE 11b. ANNUAL DEPOSITION (MG/M**2) OF FE -1982

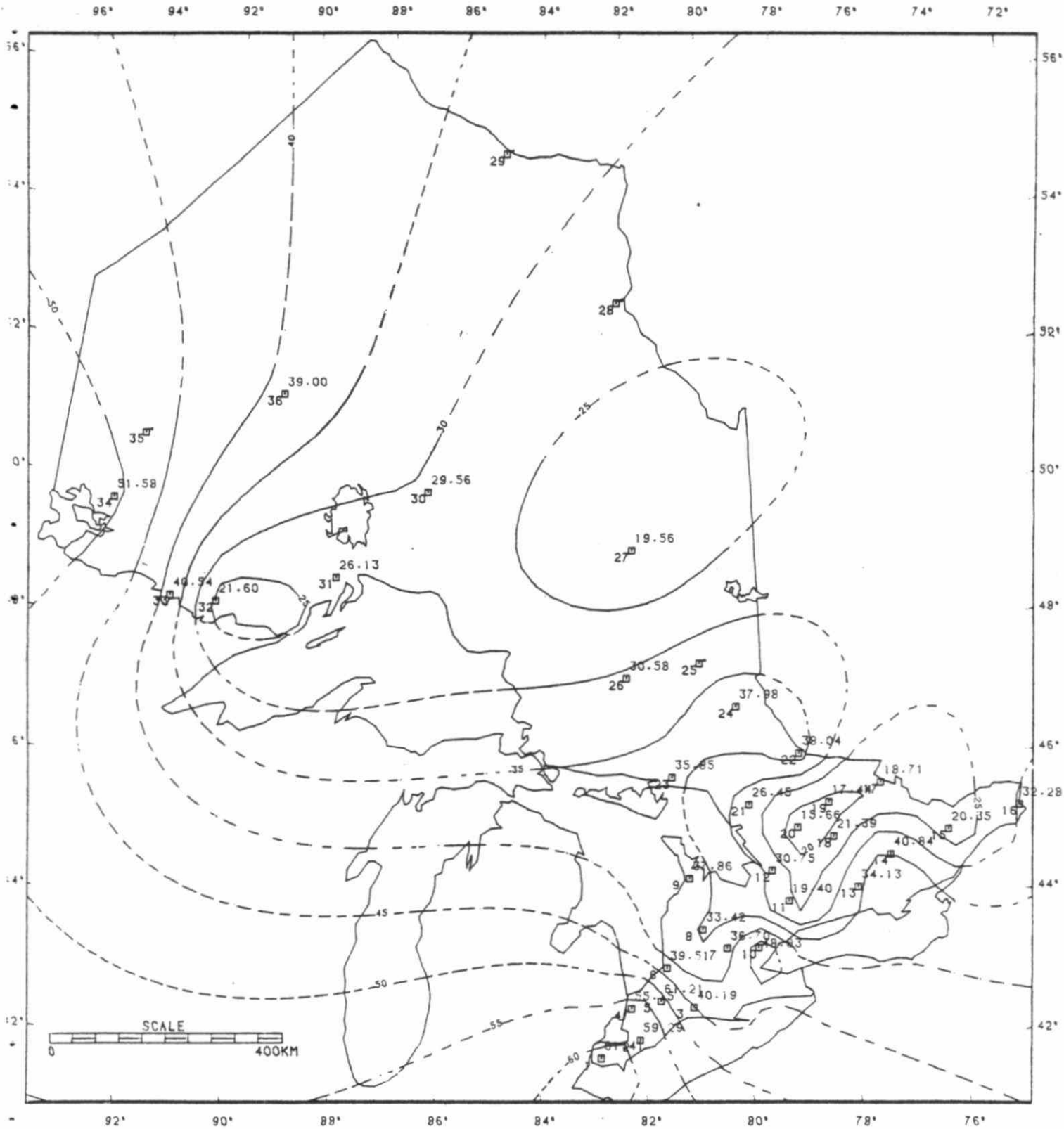

FIGURE 12a.AVERAGE ANNUAL CONCENTRATION(UG/L) OF AL -1982

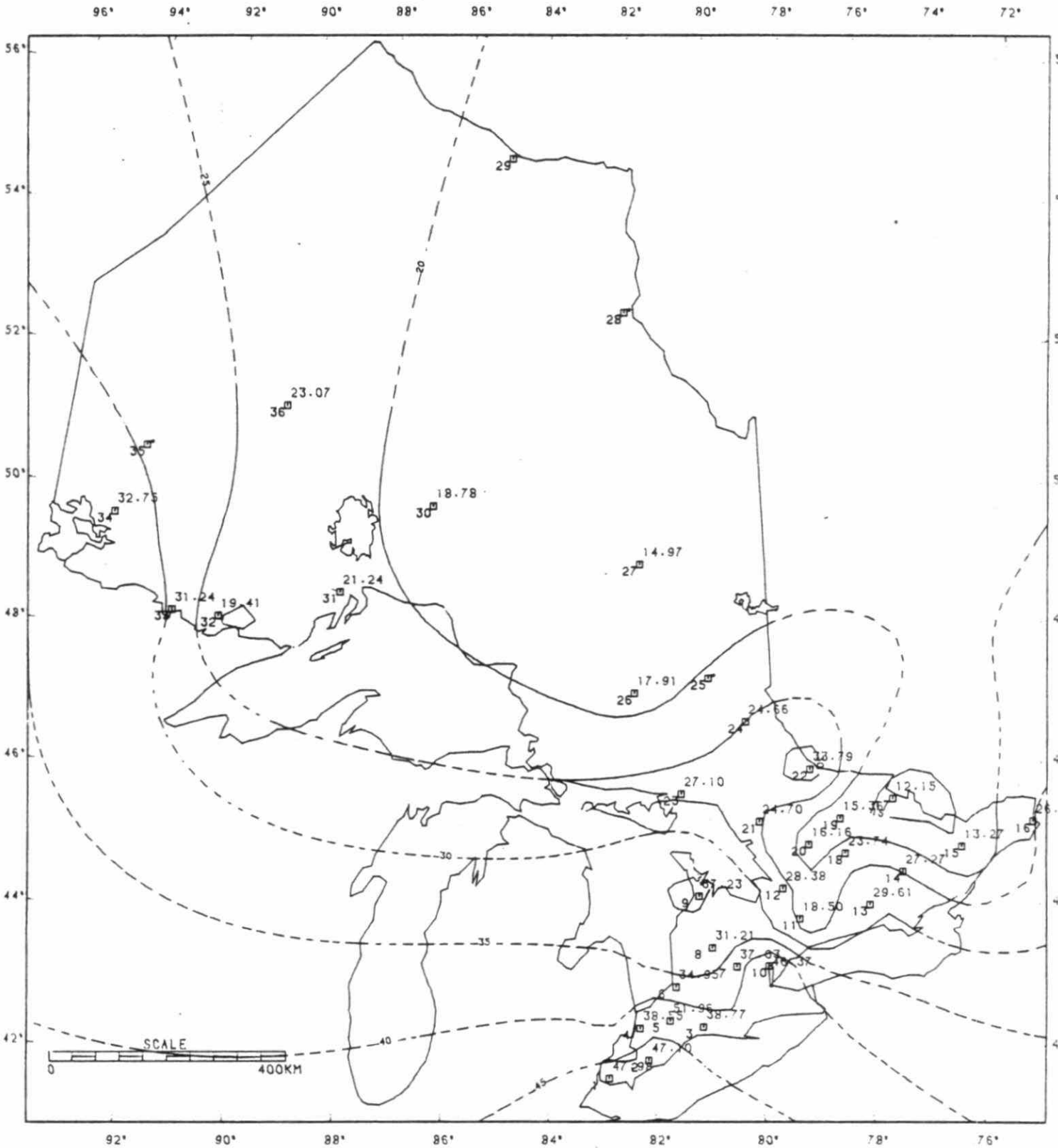

FIGURE 12b. ANNUAL DEPOSITION (MG/M**2) OF AL -1982

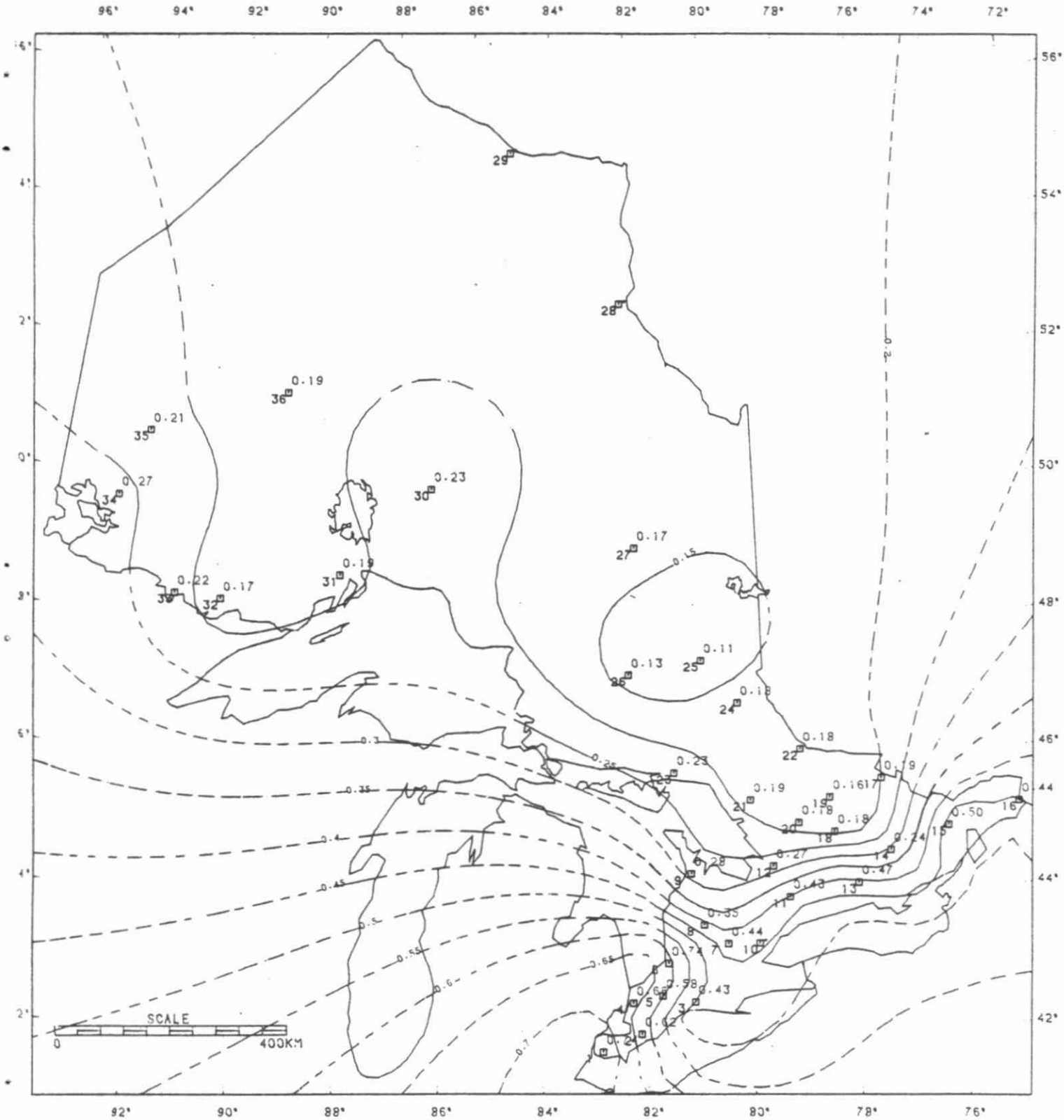

FIGURE 13a. ANNUAL AVERAGE CONCENTRATION (MG/L) OF CA - 1982

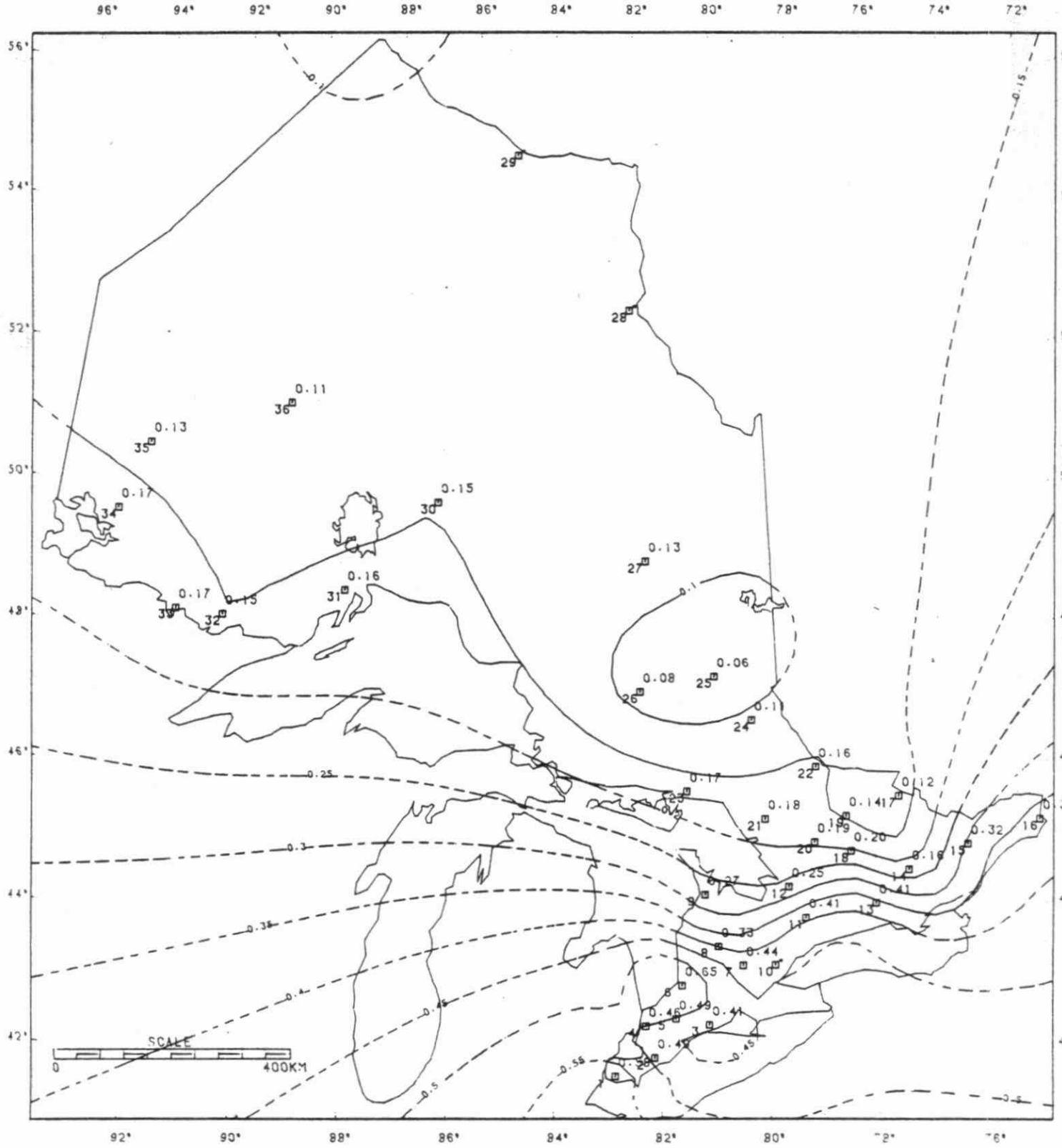

FIGURE 13b ANNUAL DEPOSITION (G/M**2) OF CA -1982

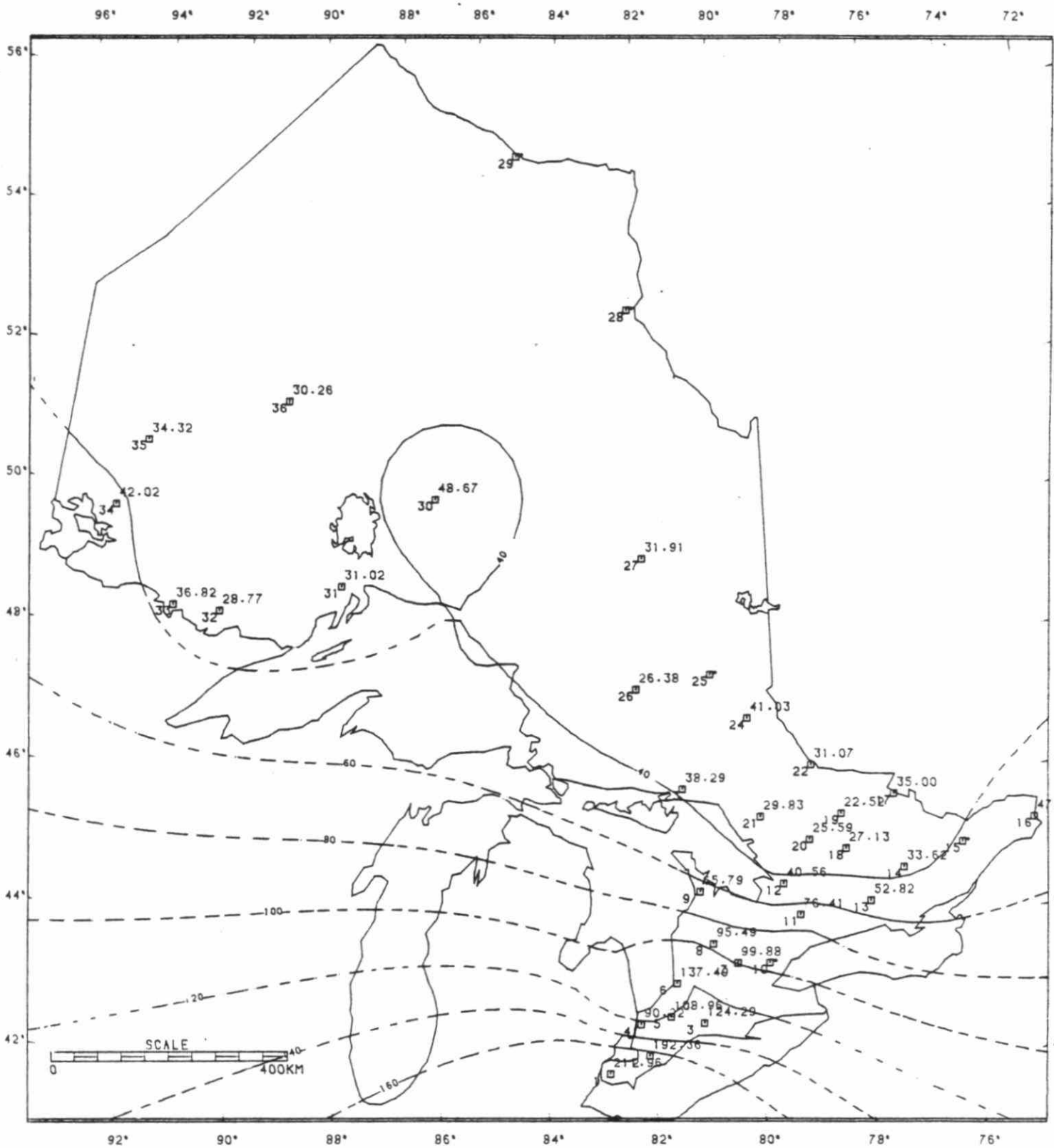

FIGURE 14a AVERAGE ANNUAL CONCENTRATION (UG/L) OF MG -1982

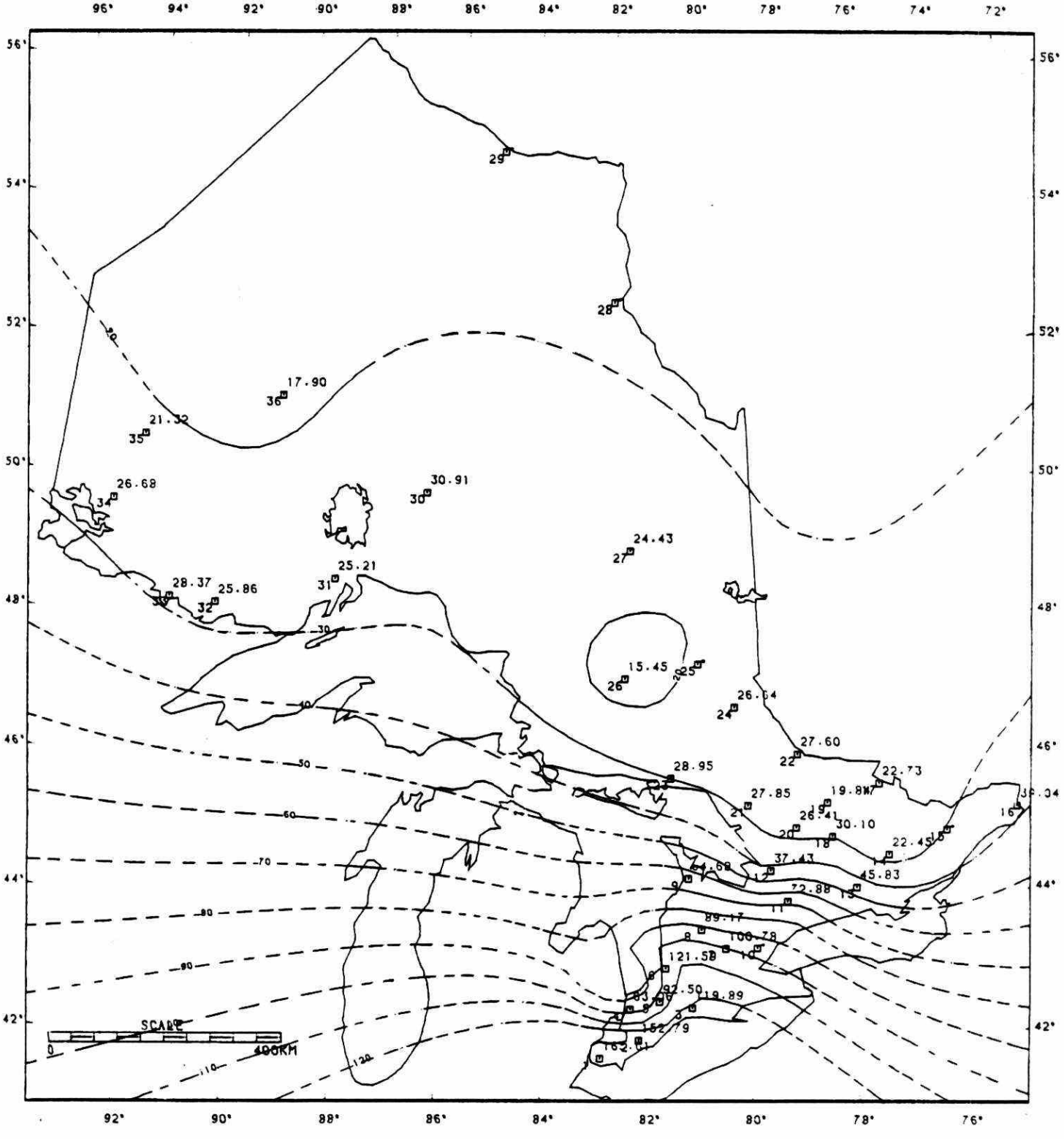

FIGURE 14b. ANNUAL DEPOSITION (MG/M**2) OF MG -1982

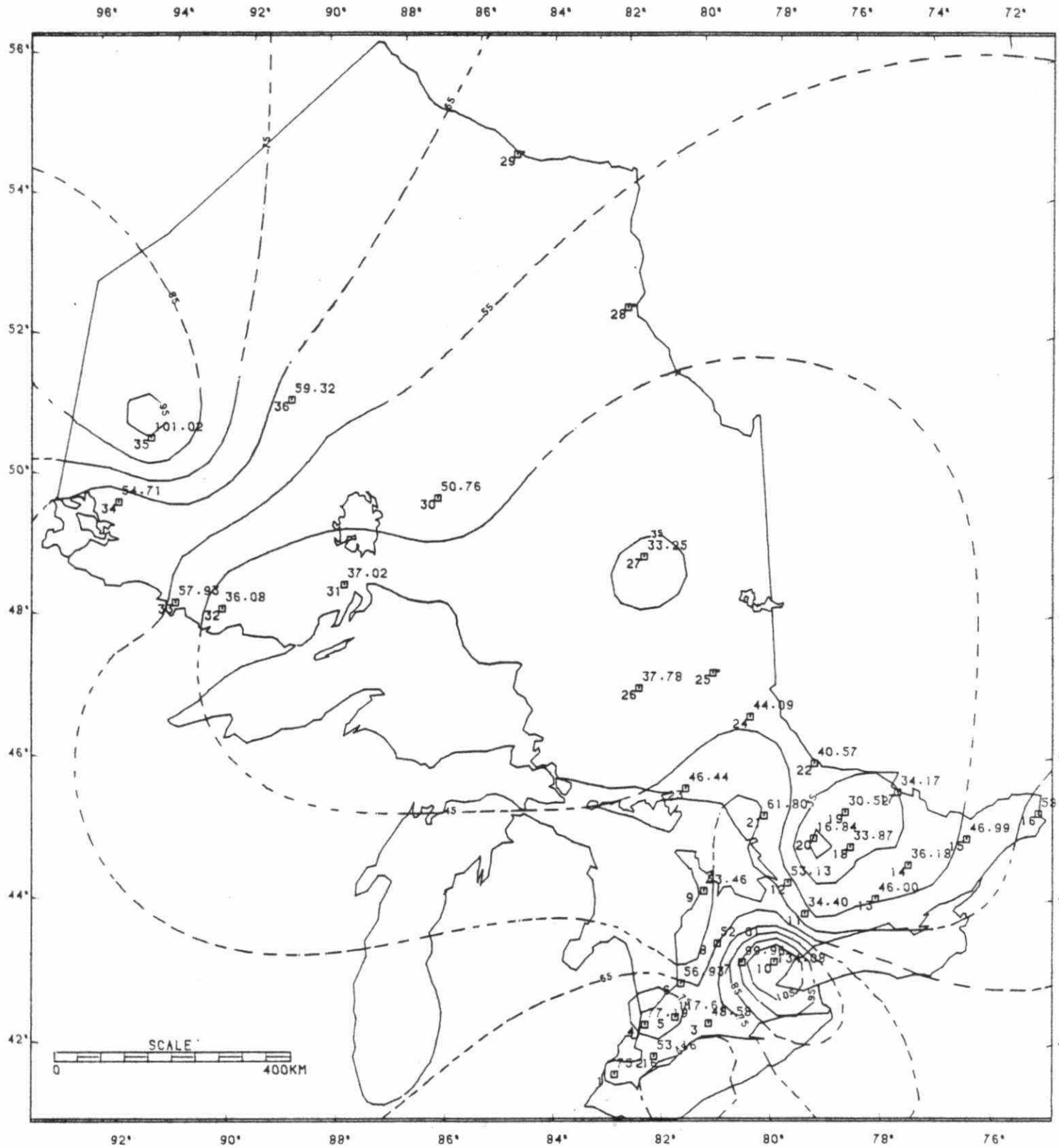

FIGURE 15a. AVERAGE ANNUAL CONCENTRATION (UG/L) OF K -1982

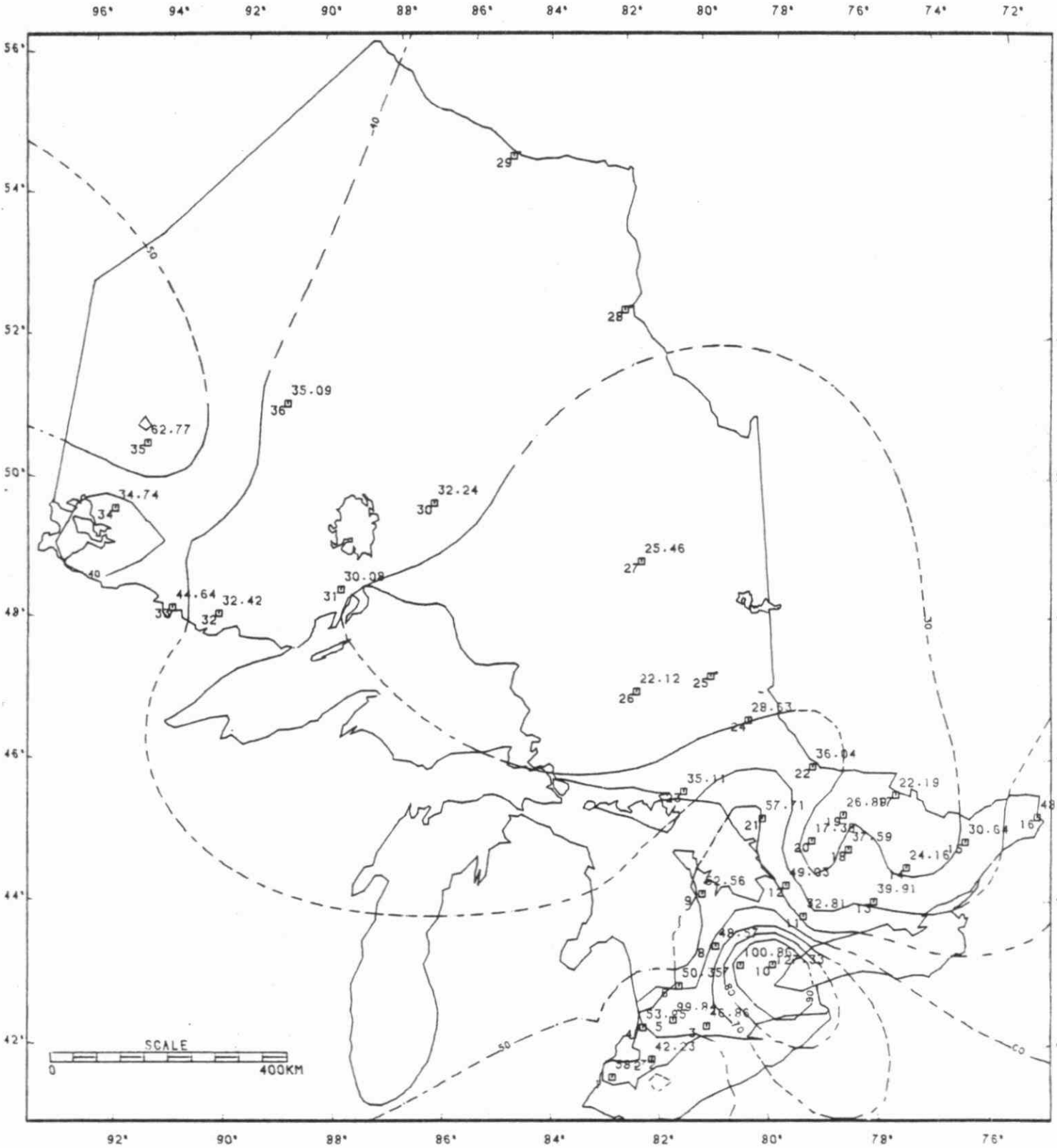

FIGURE 15b. ANNUAL DEPOSITION (MG/M**2) OF K -1982

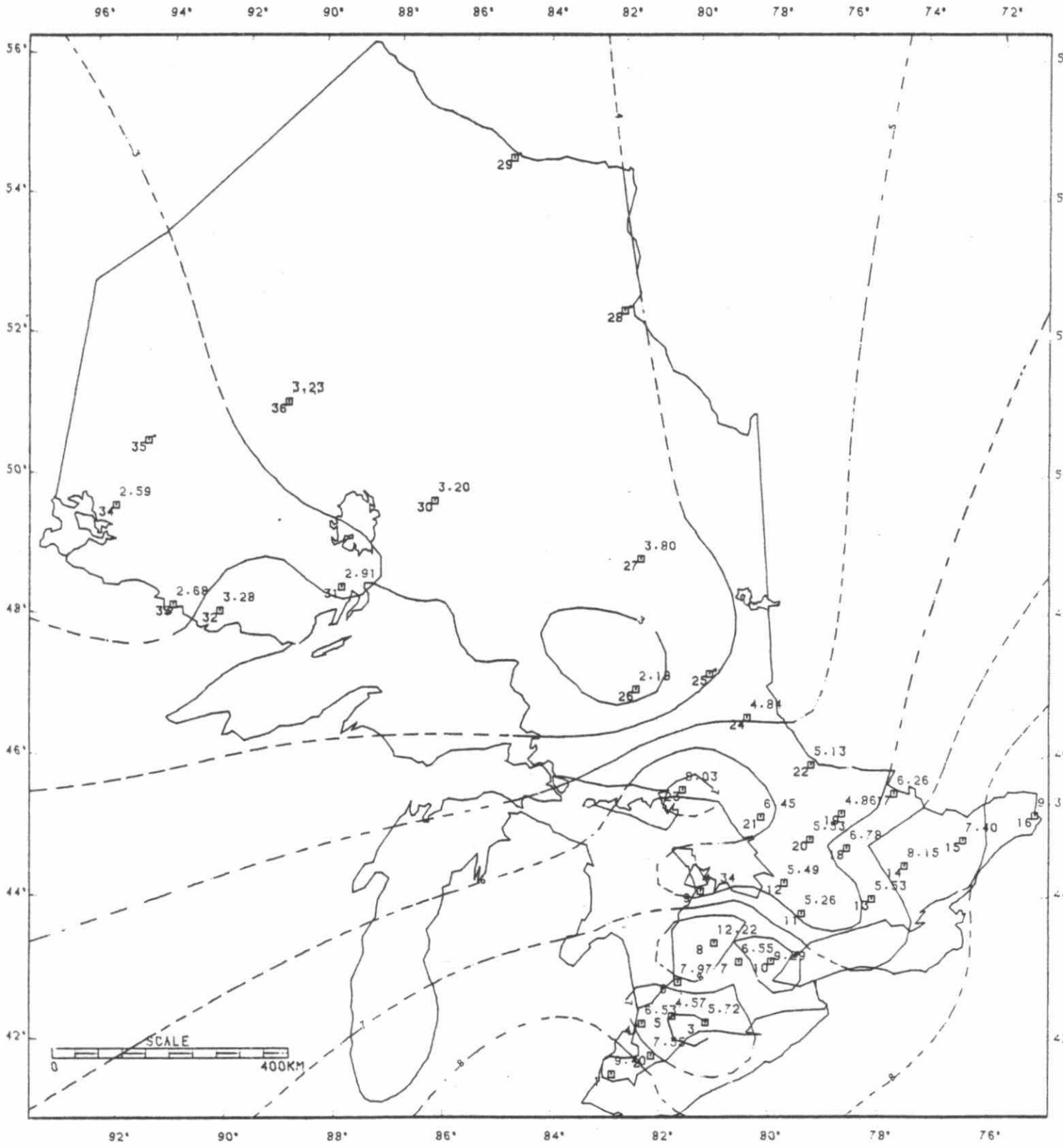

FIGURE 16a AVERAGE ANNUAL CONCENTRATION (UG/L) OF PB -1982

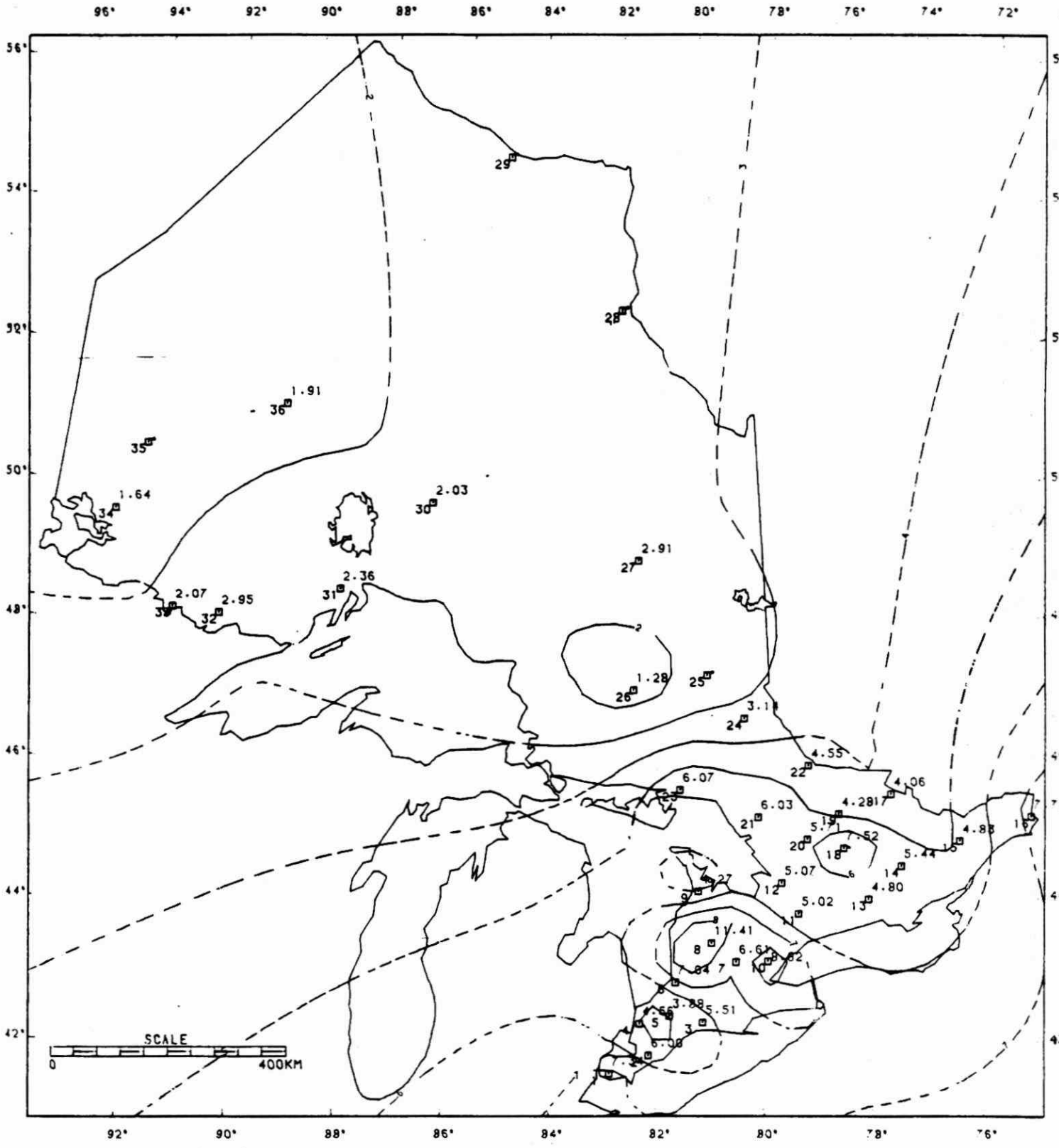

FIGURE 16b. ANNUAL DEPOSITION (MG/M**2) OF PB -1982

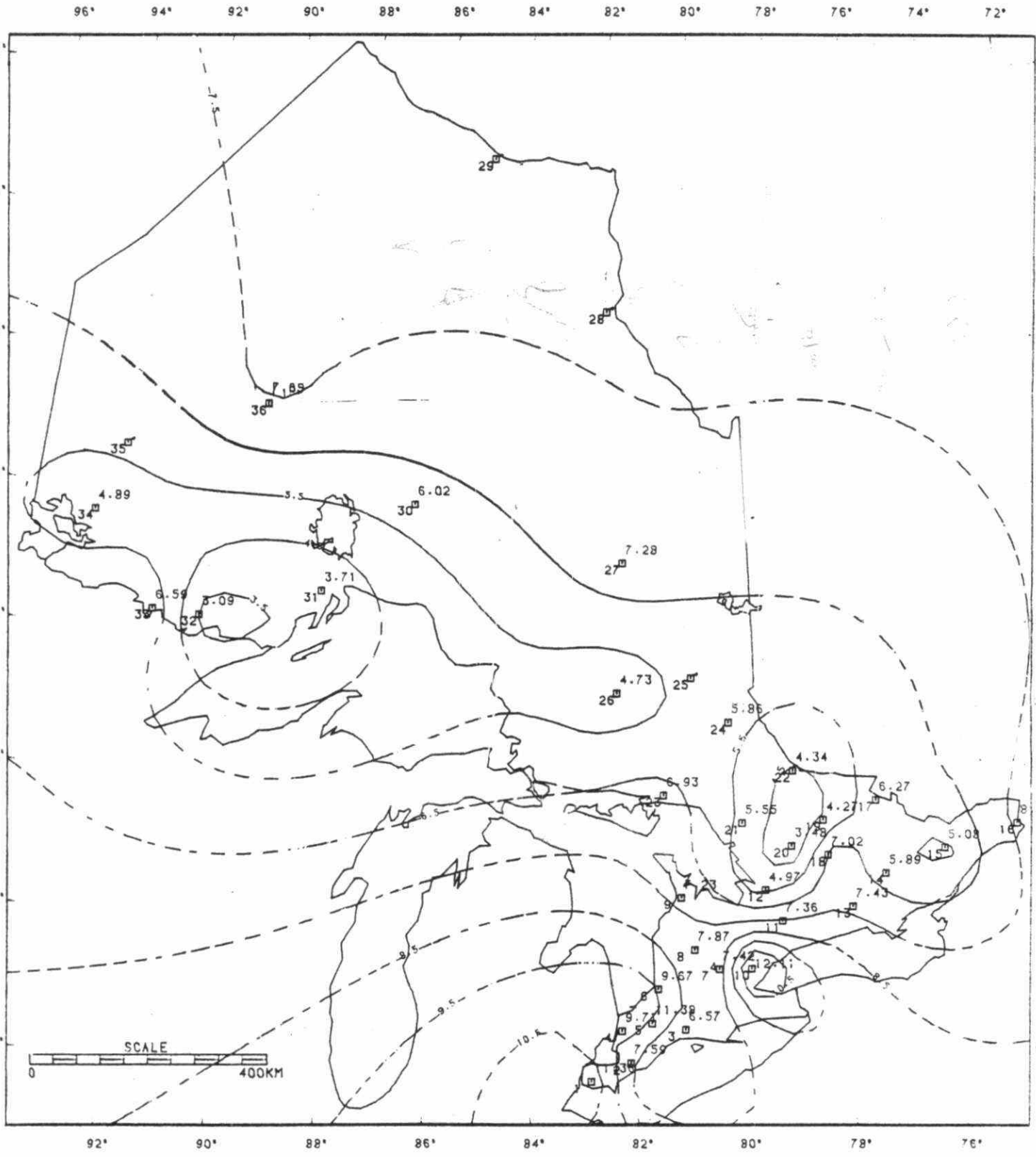

FIGURE 17a AVERAGE ANNUAL CONCENTRATION (UG/L) OF ZN -1982

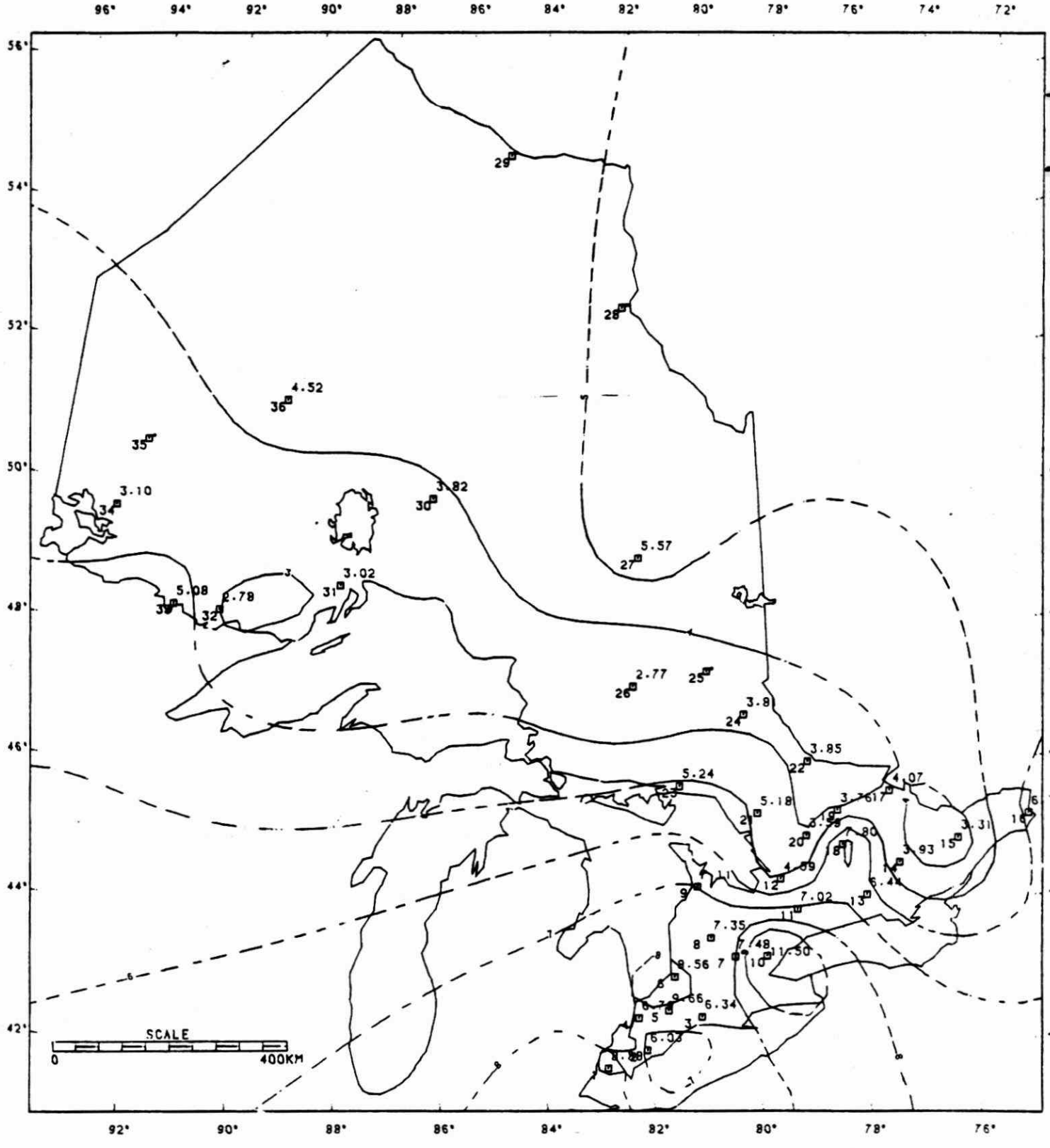

FIGURE 17b. ANNUAL DEPOSITION (MG/M**2) OF ZN -1982

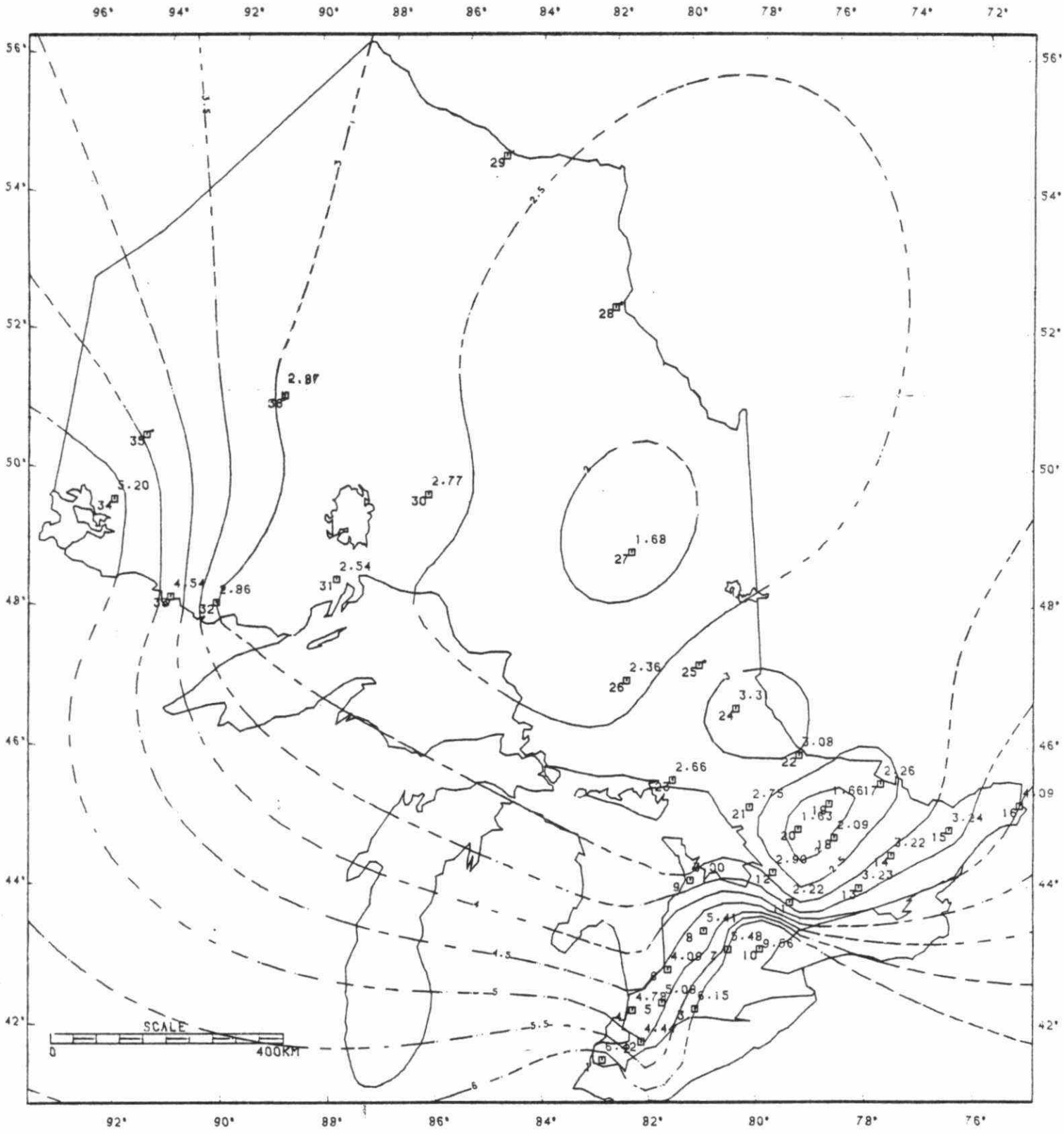

FIGURE 18a AVERAGE ANNUAL CONCENTRATION (UG/L) OF MN -1982

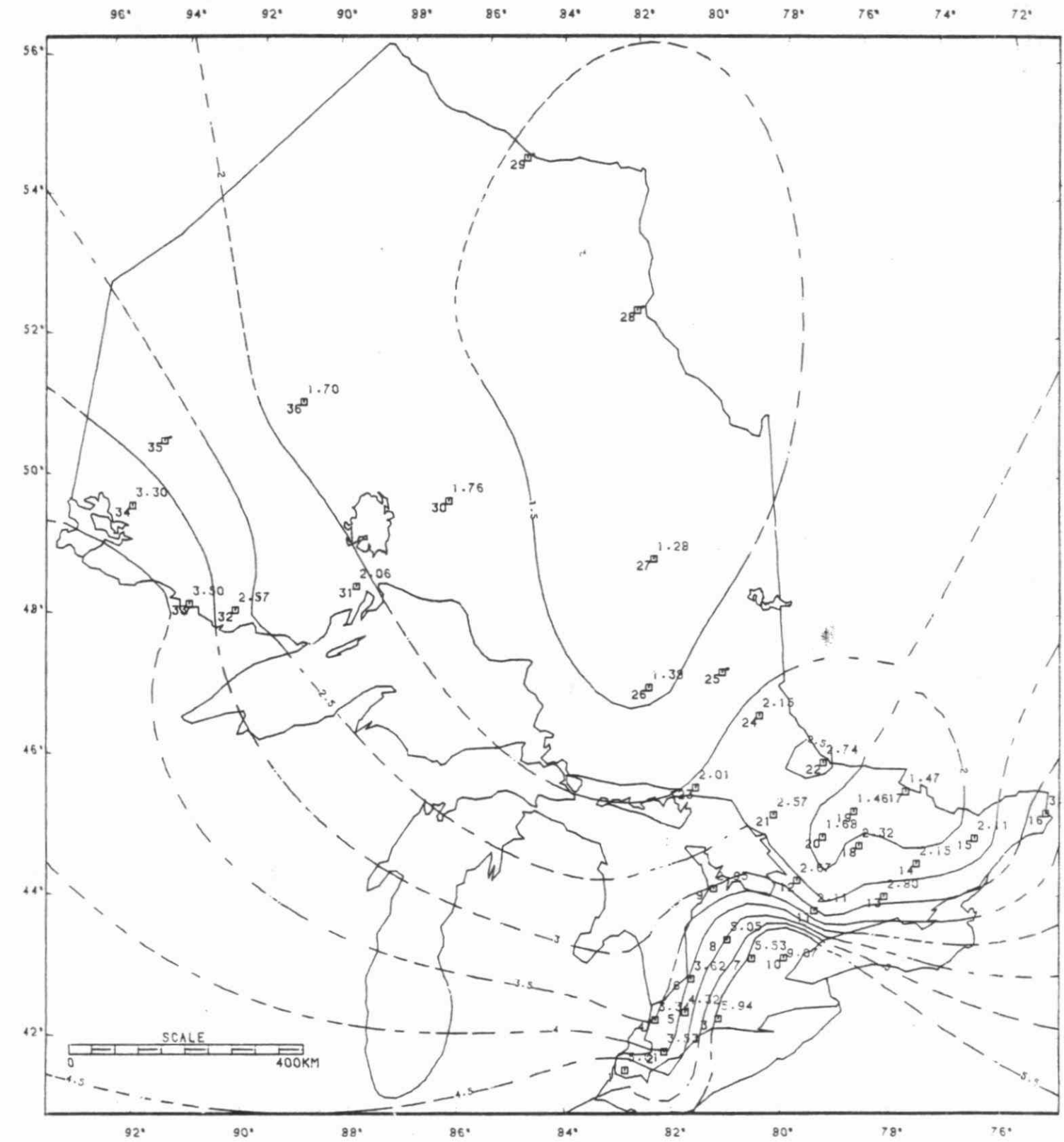

FIGURE 18b. ANNUAL DEPOSITION (MG/M**2) OF MN -1982

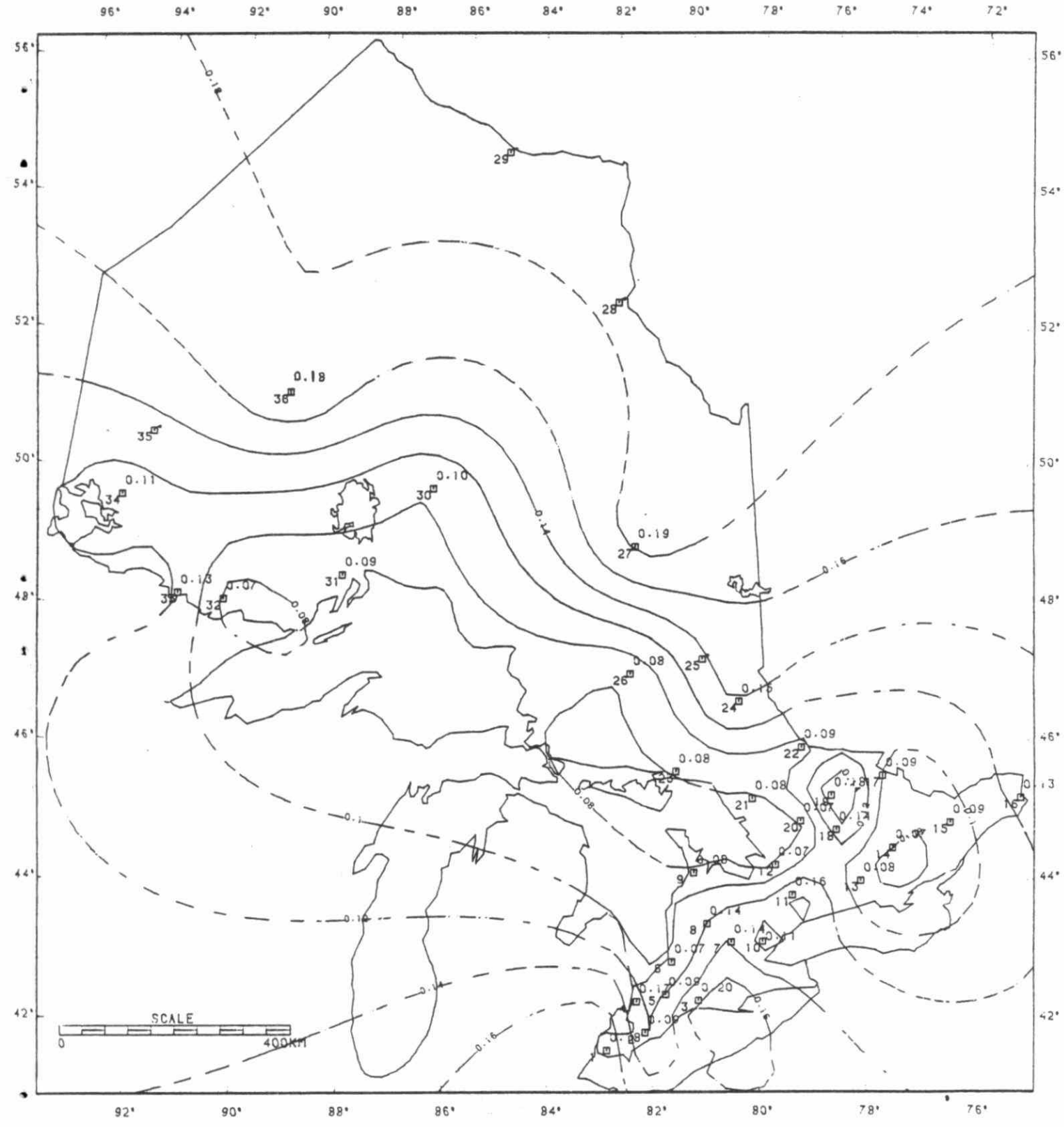

FIGURE 19a AVERAGE ANNUAL CONCENTRATION (UG/L) OF CD -1982

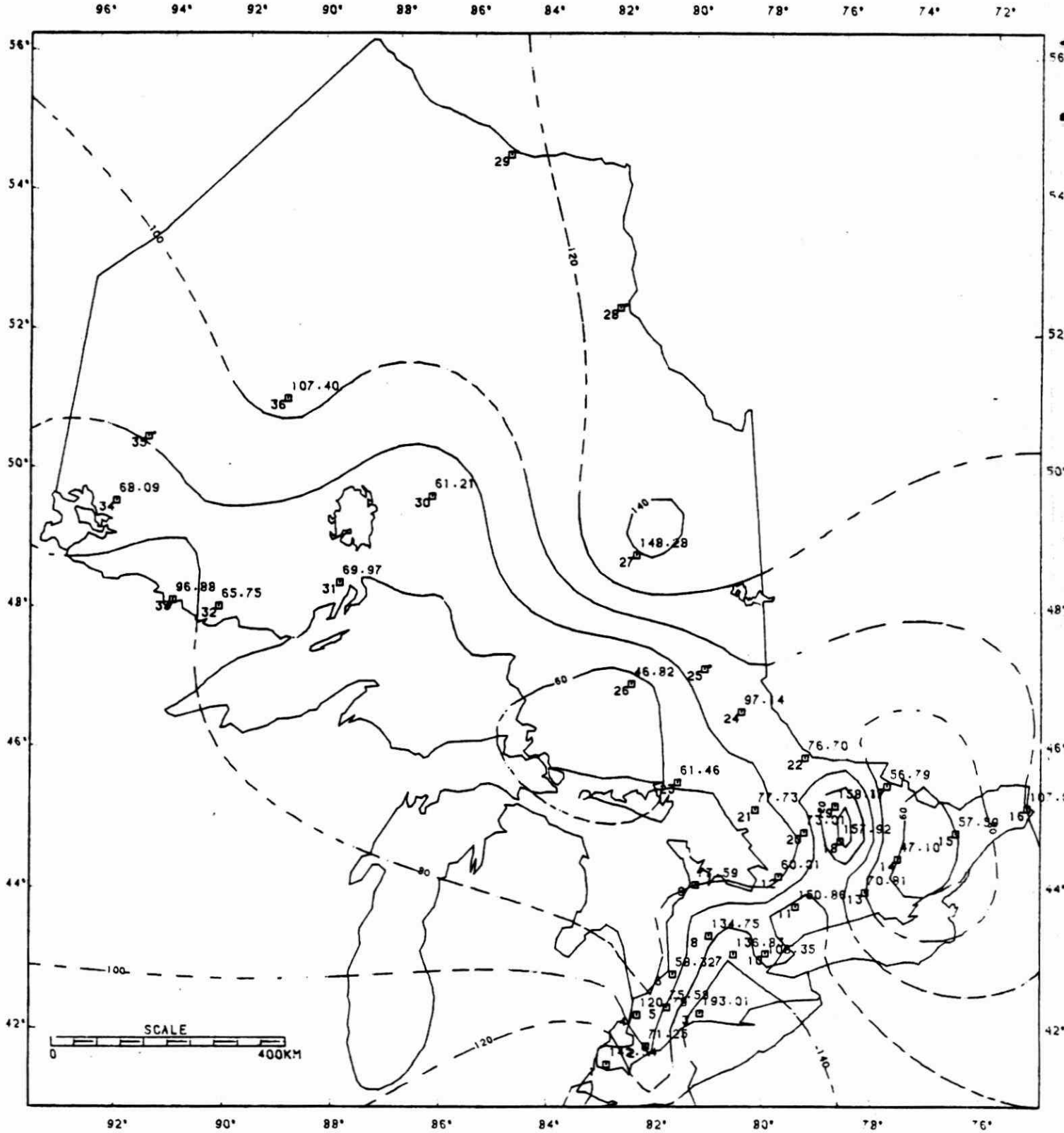

FIGURE 19b. ANNUAL DEPOSITION (UG/M**2) OF OD -1982

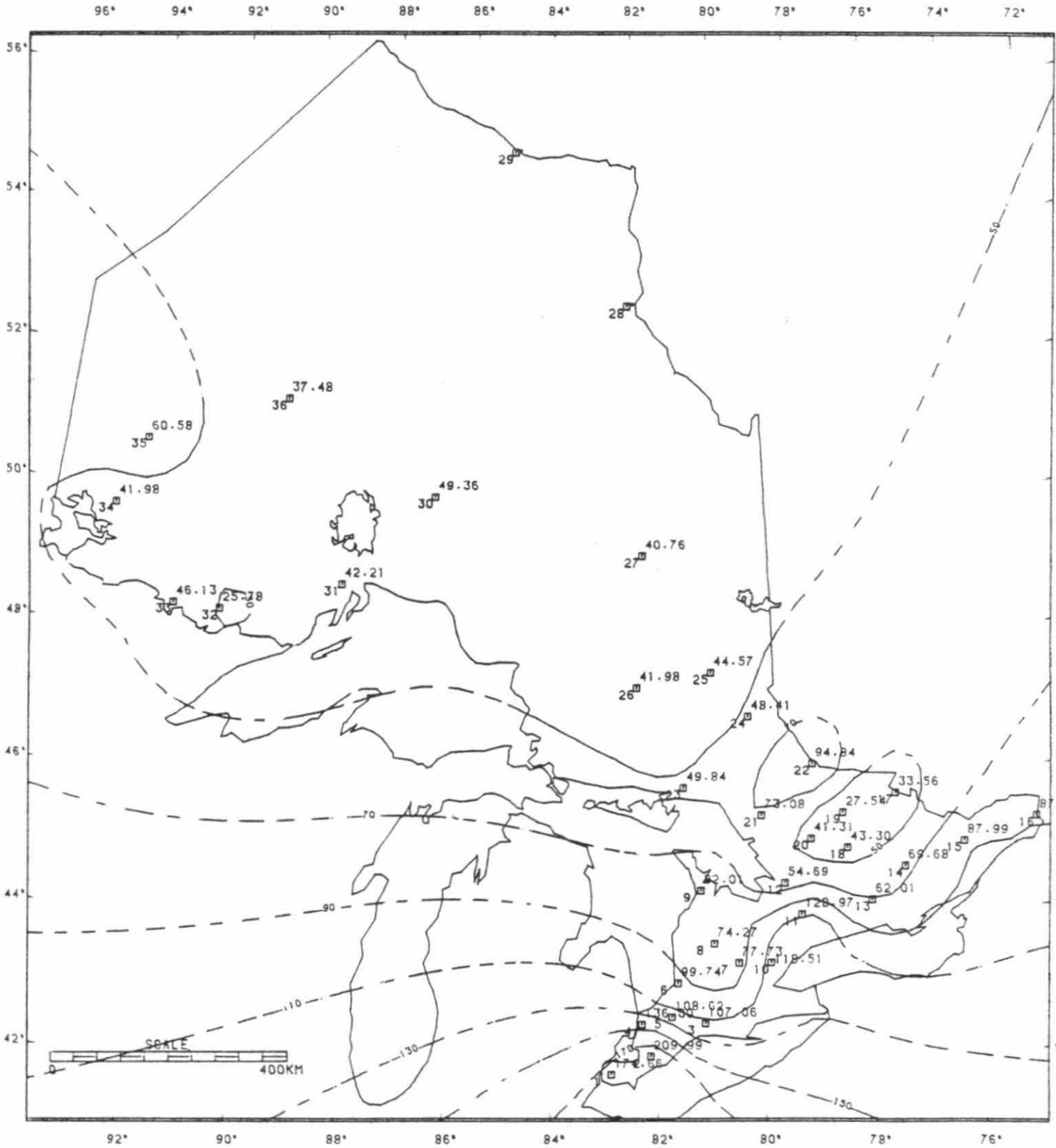

FIGURE 20a. AVERAGE ANNUAL CONCENTRATION (UG/L) OF NA -1982

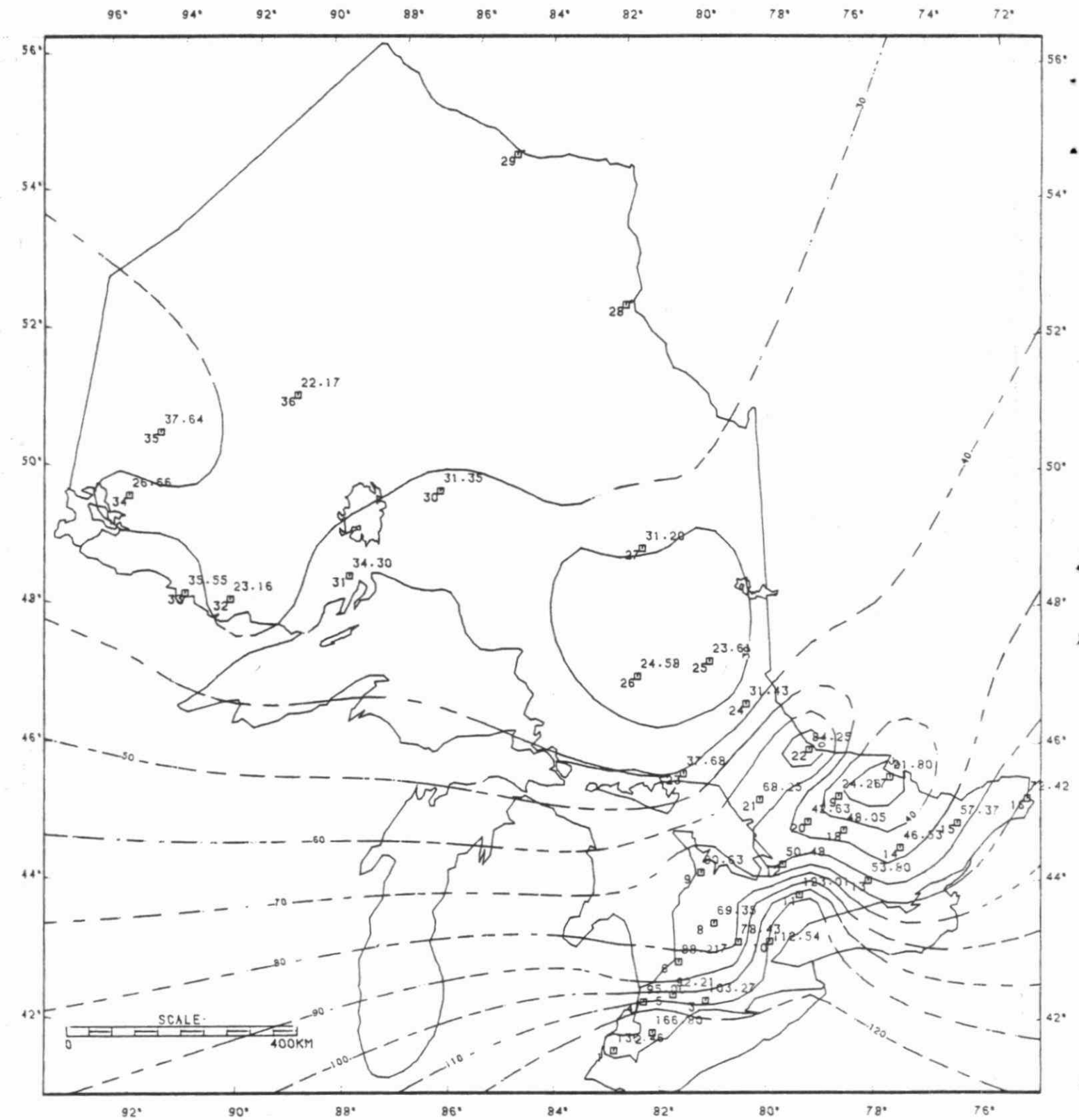

FIGURE 20b. ANNUAL DEPOSITION (MG/M**2) OF NA -1982

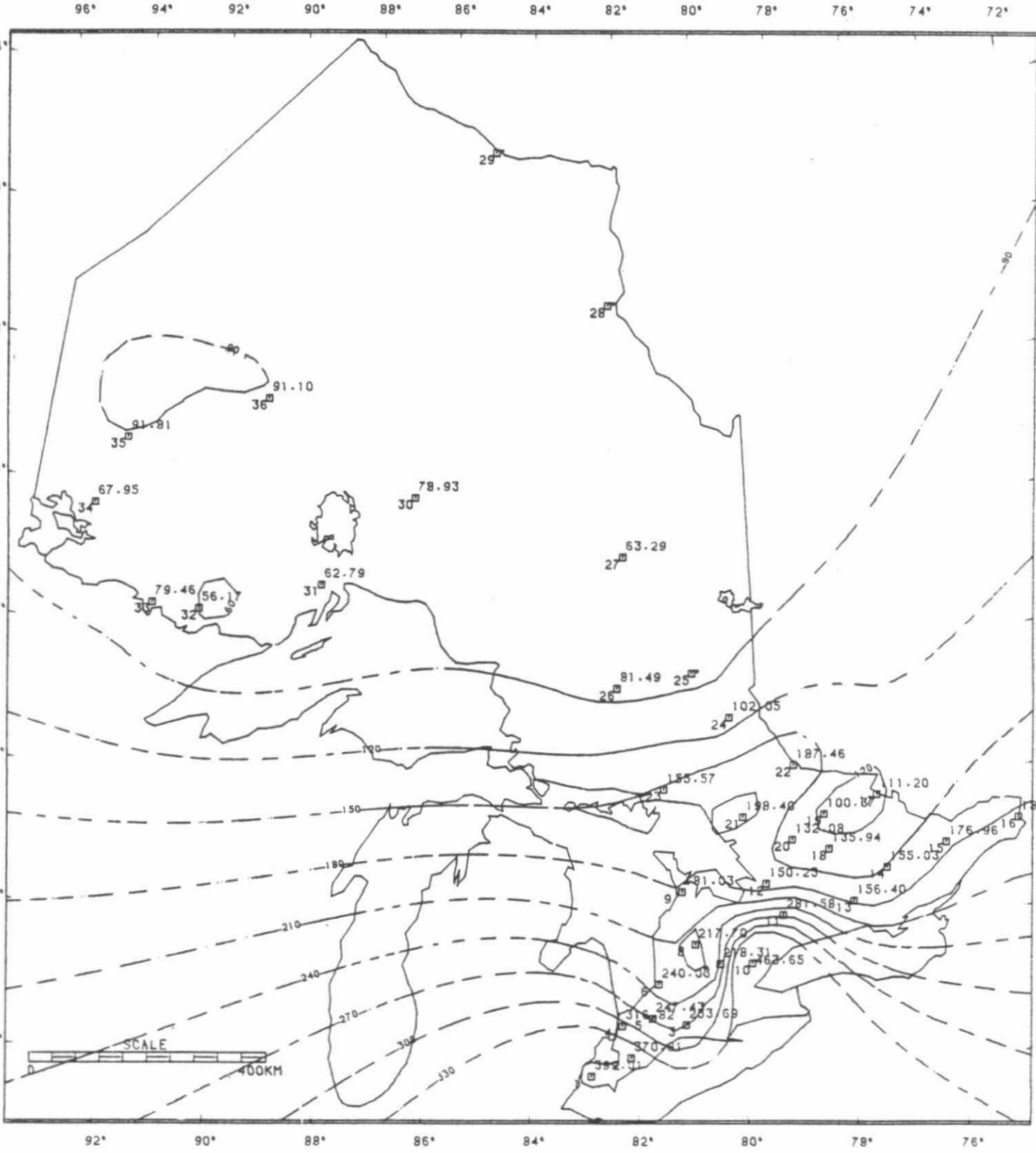

FIGURE 21a. AVERAGE ANNUAL CONCENTRATION (UG/L) OF CL -1982

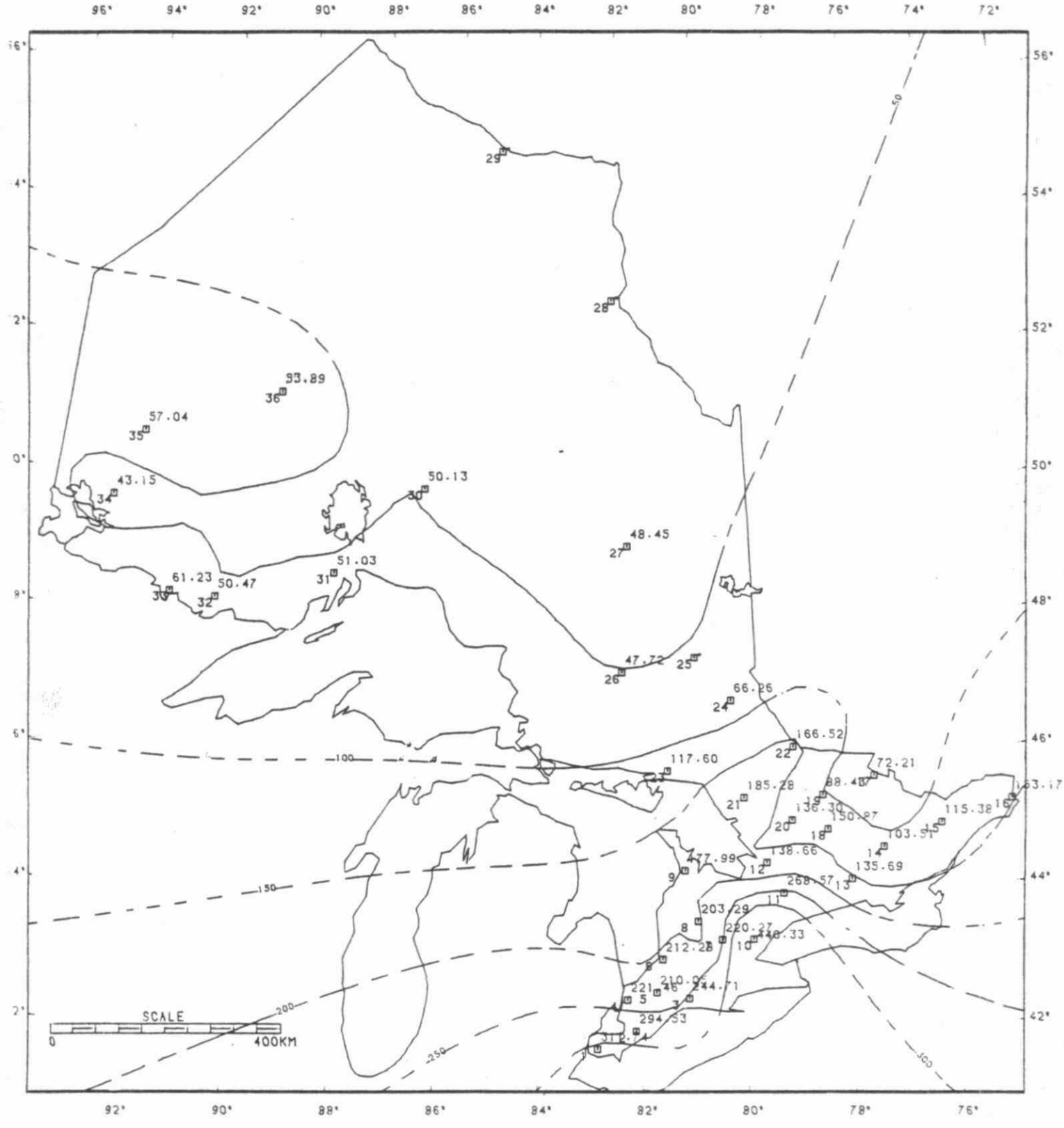

FIGURE 21b. ANNUAL DEPOSITION (MG/M••2) OF CL -1982